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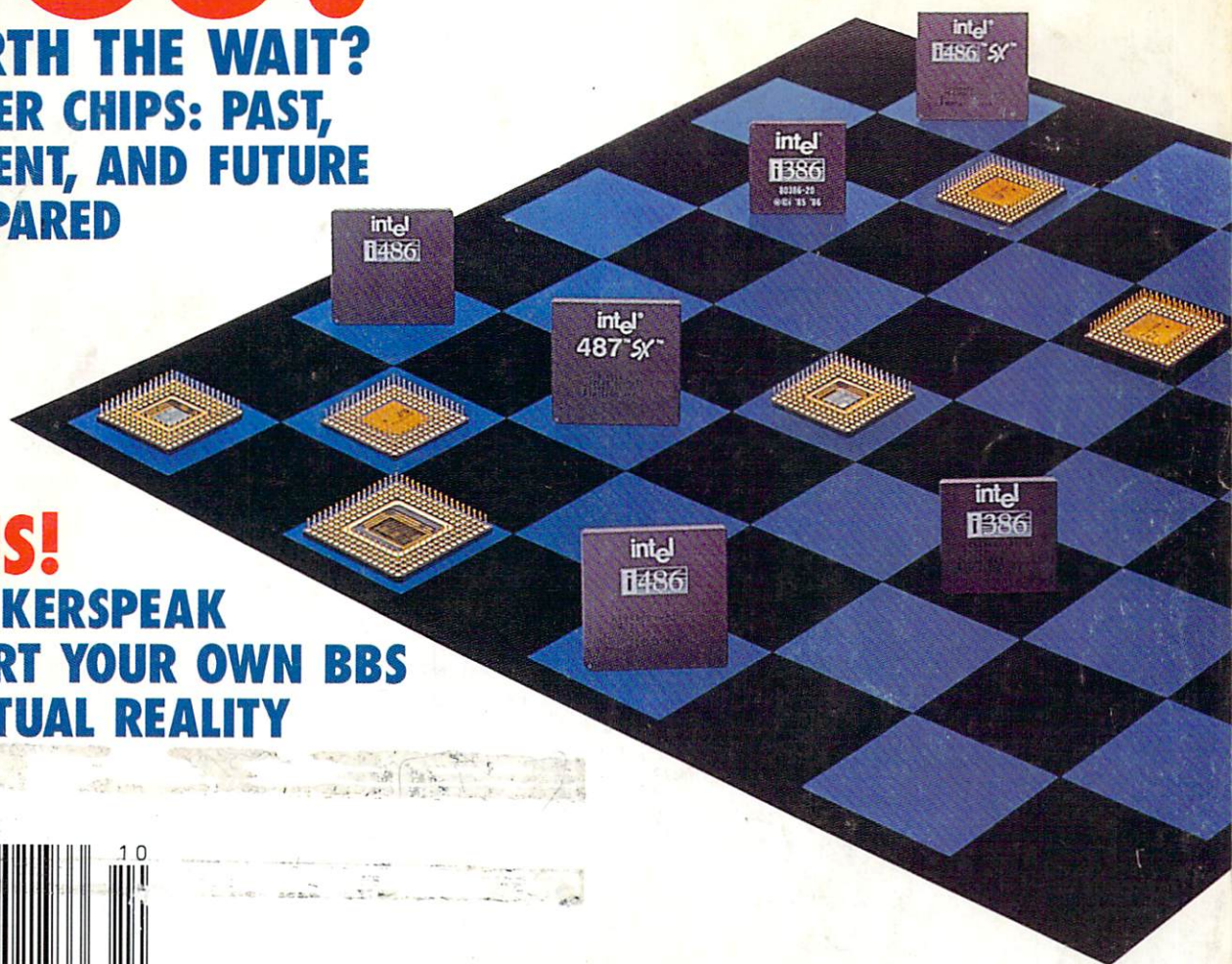
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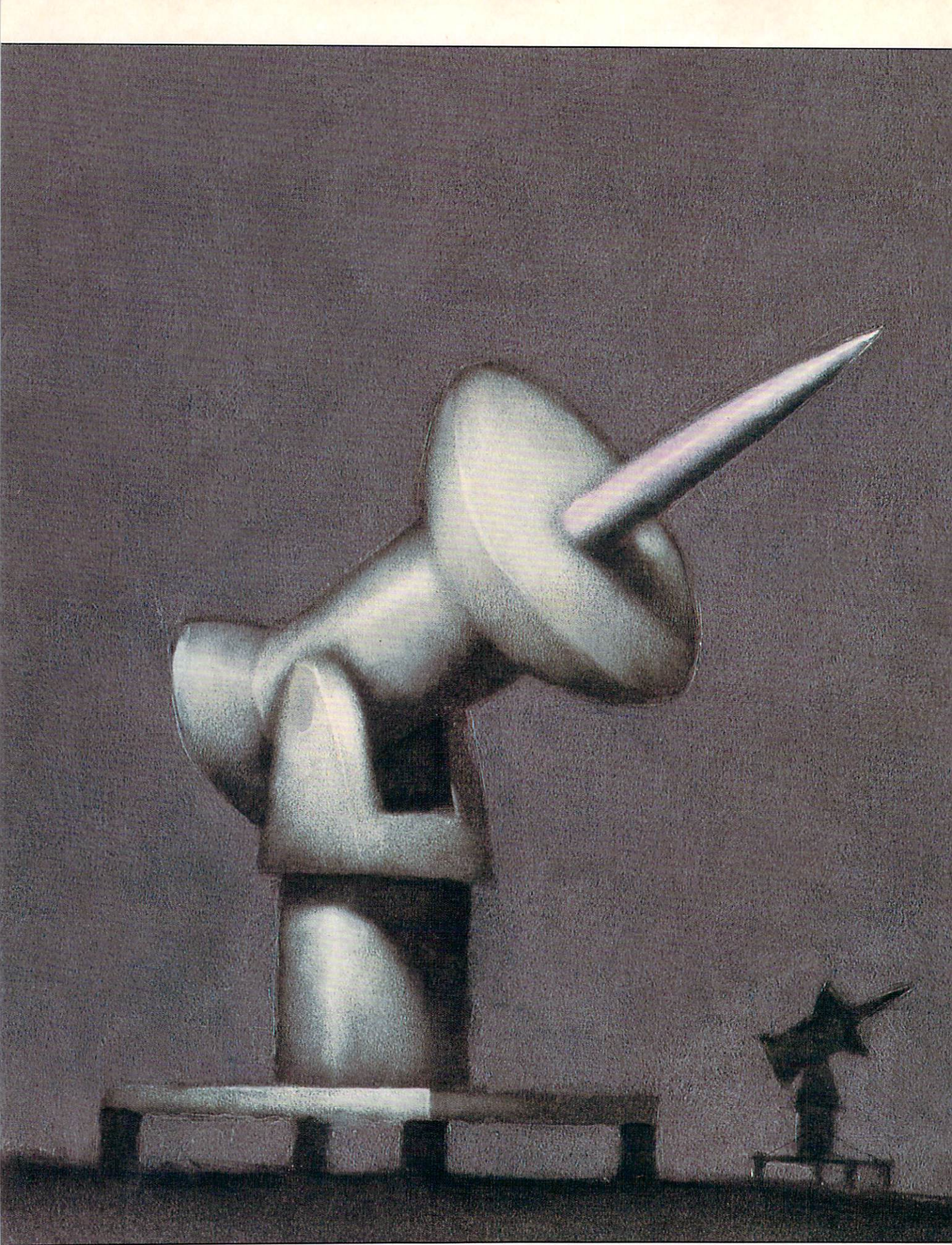


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64/128 VIEW

This month, I'll introduce readers to the editorial staff members who edit the pages of Gazette.

Tom Netsel

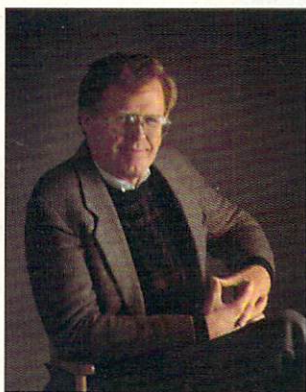
This month, readers who subscribe to Gazette and Amiga Resource will have a chance to meet the editors who produce those sections.

As editor of Gazette, I'm lucky enough to have the help of technical editor Bruce Bowden. Bruce answers many of the questions that appear in Gazette's "Feedback" column, and he serves on the committee that selects type-in programs. Bruce describes his

ful to "the greatest 8-bit computers ever built."

I'm the other Gazette staff member. I joined COMPUTE's features department in 1987, coming from a mixed background of electronics, photography, and journalism. The first stems from an interest in amateur radio that led to electronics training in the U.S. Navy followed by a stint at Cape Canaveral during the Apollo/Saturn V days.

From the Cape, I moved

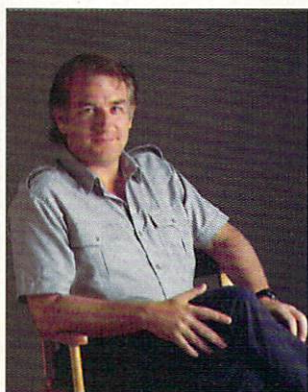


Gazette's editorial staff consists of editor Tom Netsel (left) and technical editor Bruce Bowden.

journey from a math and physics background to computing as "a natural extension of an abiding interest in formal systems."

Bruce bought his first 64 in 1984 and began making his mark writing unique shareware programs—probably the best known of which is Graphic Assault System, a graphic utility.

He joined the COMPUTE staff in July 1990 and divides his time between Gazette and other technical and online service duties. (He is known as Sourcerer on QuantumLink.) Though the IBM is his principle tool these days, he remains faith-



ful to New York to study photography. That field eventually led me back to central Florida as a photojournalist.

In the early 1980s, I gravitated from the newspaper's darkroom to its newsroom, trading my Nikon for a word processor. A short time later, I picked up a degree in journalism and a computer.

A professor at the University of Central Florida in Orlando recommended a new model called the Commodore 64. I tried it, liked it, and bought it. Commercial software for it was scarce then, but I found COMPUTE's Gazette and began typing in programs. □

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Can a GEOS fan find happiness
using a non-GEOS
word processor? Try one of
these and see.

WORD PROCESSING WITHOUT GEOS

BY DOROTHY HEMME

GEOS is wonderful, and I love geoWrite. I'm attracted to this graphics environment by its various fonts and type sizes, its pull-down menus, and its allowing the user to point and click on icons.

With all of geoWrite's printing options, I can tailor my writing to fit my audience. Whenever I write letters to family members, its crazy fonts help me express my mood. At school, when I want to give my students short, clear directions for an assignment, the 14- and 18-point font sizes are great for emphasizing these instructions. So what's the beef? Why not use GEOS all the time? It's a great program, and I love it.

My problem is that I also hate geoWrite. I'm sorry to have to say this, but it does have its faults. As Steve Vander Ark mentioned in his November 1991 "GEOS" column, geoWrite is slow and tends to skip letters when you're

cranked up, typing rapidly. Since I use a 128, I don't have as great a problem as those who use a 64 and have to enter text in BSW font with screen-size margins so that the computer doesn't have to keep redrawing the screen.

While GEOS lets me use a number of fun fonts, its print quality—unless you have a laser printer—leaves a bit to be desired for serious correspondence. I don't own a laser printer, I don't have the funds to invest in one, and I don't have the time to send off my geoWrite documents to a printing service and then wait for the mail to bring them back.

Since I also use a modem and have a need to transmit files in true ASCII to an Associated Press computer, I don't want to type an article with GEOS, save it to disk, run a separate spelling checker program on it, resave the corrected article, pull down the menu to



convert GEOS to a sequential file, save it again, and then finally load my terminal program.

I know this will sound like out-and-out heresy to GEOS lovers, but my solution is to use regular, commercial word processor programs of the non-GEOS variety. Although these programs have no icons to click on and I've had to memorize a few commands, I feel this minimal investment of brainpower is worth the effort. For those of you who have true letter quality printers and 9-pin dot-matrix printers, regular word processors may be more to your liking in their versatility, print quality, and ease of use. Don't get me wrong; I still love and use geoWrite. But there are times when other word processors are better for the task at hand.

A Speedy Solution

I've used several good word processors upon occasion, and here are some I can recommend. COMPUTE's SpeedScript is a great word processor, and there are versions for both the 64 and 128. Included on the SpeedScript disk is a conversion program to change the word processor's screen code program files to true ASCII sequential files. Until recently, I had to save the file, exit the original program, load the conversion program, load my text file, and then switch disks while the program converts and saves my sequential file to disk.

I discovered a program on Quantum-Link called SpeedScript Modified for the 64. It takes any version of SpeedScript and alters it so that it can load and save sequential files. The only downside is that SpeedScript Modified has no 80-column preview mode. When I write an article that's to be sent by modem, however, it doesn't have to be previewed as a printed page, so a preview feature isn't important.

If you print hardcopies of most of your documents, however, the SpeedScript disk does include an 80-column preview patch for modifying SpeedScript. With the press of a couple of keys, you can see onscreen how your printed page will look before you send your document to the printer.

Like many programs, SpeedScript has a few surprises even for veteran users. I recently discovered that it does have an option that will let me print a file to disk as a true ASCII or Commodore ASCII sequential file. This often-overlooked format command saves me the bother of using a conversion program. Now I can upload files by modem with even less hassle. Sometimes it pays to read the manual!

Separate spelling checker programs

are available for both versions of SpeedScript. These programs must be run after you've written and saved a document.

I often have occasion to use hanging indents with Roman numerals when typing outlines or test questions and answers, so I need a program that offers variable margins. SpeedScript does offer a margin-release option. With both versions of SpeedScript, text is formatted automatically with preset page lengths and margins, but these are easily changed with a simple format command. Give this one a try. SpeedScript is quick, and it uses simple format commands. It beats trying to drag icons to an exact spot and risking the possibility of dropping them in the wrong area.

The Fleet's In

Another solution to my writing problems when I have specialized needs is Fleet System by Professional Software. I have version 2, but I'd like to upgrade to version 4 for the 128, with its pull-down menus. Unfortunately, both of these programs have been discontinued, but copies often show up at swap meets. In addition to the spelling checker disk that works within the program, version 4 has a thesaurus.

Version 4, like SpeedScript, has true word-wrap, which makes looking over your typing much easier. Fleet System 2 doesn't have word-wrap, which is a drawback, but it does have advantages of its own. It works with the 64 in 40-column mode and can scroll to 80-column width for a preview. In 80-column mode on a 128, it presents an exact view of what's on each page.

Fleet System comes with a short tutorial and a detailed but easy-to-understand user's manual. This word processor has all of the advantages you'd expect in a commercial word processor. It can link long files, has local and global search and replace, has an extra text area if I need to look at the disk's directory or other files, and offers a sophisticated way to move blocks of text.

All margins in Fleet System are variable; just set them at the top of the file. Later, if I want to change the margins, I simply and easily insert a command to change them inside the document. The margins are just like those found on a typewriter. I can change them for a Roman numeral outline with the hanging indents that I need when preparing question numbers and items for a test.

When I use a letter quality printer, I save the file as is with no adjustments. Like GEOS, I just choose the selectable printer driver. If I'm printing a test

for students, I normally use a dot-matrix printer. In this case, I use the printer's escape codes and print in double-strike or near letter quality mode. This produces printing that is clearer and easier to read than normal draft mode. This isn't a difficult operation, folks. Usually, one embedded command lets me use a variety of printing options.

If I have to send a Fleet System file through my modem, I hit one key, and I can store the file to disk as true ASCII. I cut out all formatting commands, which are essential only for a printer, and save text only. All the operations are accomplished while I'm still in the word processor. I don't have to change disks or resave numerous times to get the ASCII file.

The Right Stuff

With The Write Stuff by Busy Bee Software, I believe I have found word processor nirvana for the 64 and 128. Yes, folks, it slices, it dices, and it makes quick work of any writing chore. For me, it has the right stuff.

The Write Stuff is much more complex than SpeedScript and Fleet System, so you'd expect a thick manual filled with time-consuming tutorials and explanations. Not so! The manual is small and thin, but the word processing disk itself contains 68 help files that you can load and read while still in the word processor. Use them as you need them, or use the Manual Maker program to print out all of the help files to read later.

Busy Bee states that The Write Stuff is not only a "full-featured, high productivity" word processor, but that it's also "intended for use by beginners, children, and occasional users." This is accomplished through a command line at the top of the screen that offers only five options: Help, Edit, Print, Save, and Load. A novice can start typing right away, save what's been written, and then hit the Print command. A print menu lets you select options such as Double Space, Margins, Line-feeds, Justify, Number of Copies, Start at a Given Page, Wait Between Pages, or Preview on an 80-Column Screen. In the Edit mode, you can Eat Text (delete it) by word, sentence, and paragraph; restore deleted text; or clear all text above or below the cursor. Nothing has to be memorized or referred to in order to type and print a draft. Neat, huh?

More experienced and sophisticated users, however, will appreciate the program's gamut of features. Once past the novice type-and-print stage, you'll want to explore and use these powerful options, with the help of The Write Stuff's enclosed cheat sheet.

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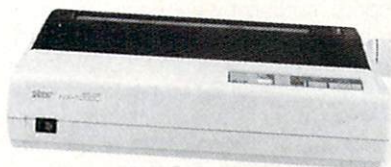
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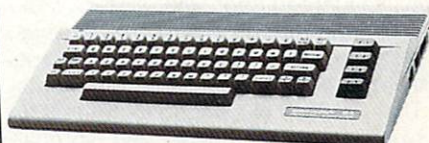
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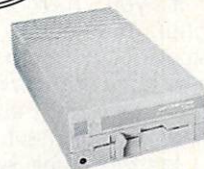
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First off, both the 64 and 128 programs come with Busy Bee Speller. In version 1, the speller is a stand-alone program that can't be accessed from within the word processor. That puts you back in the SpeedScript and GEOS category, saving your text, exiting the program, loading the spelling checker, and then saving the corrected text.

In version 2, however, the spelling checker boots with The Write Stuff and can be used from within the program. The great thing about this spelling checker is that it doesn't just flag suspected words from its dictionary and force you to look them up. For good spellers, BB Speller has a quick 17,000-word dictionary that finds most common words for fast typo checking. If you're a poor speller, an additional 61,000 words kick in. You can select an option that will automatically correct your spelling. There's none of that time-consuming business of trying to look up a word when you don't know how to spell it in the first place. In addition, you can add 15,000 words of your own and delete those that you don't need.

The Write Stuff offers a multitude of features that let you get as complicated as you want. By progressing through the features in stages, complexity isn't forced upon you. A Menu Maker lets you create custom disk menus, edit program names beyond the usual 16 characters, and add comments. Thus, instead of trying to remember an exact program name to load, you can search through a menu of meaningful filenames, complete with brief descriptions. Children and poor typists will like the fact that they can use the cursor to load files.

Like SpeedScript, The Write Stuff saves text as program (PRG) files in screen code, but you can save text as sequential (SEQ) files with the press of a key. If you have files from SpeedScript, Easy Script, PaperClip, Fleet System, or other word processors and want to convert them for use with TWS, the program offers automatic file translation for ten different word processors. I loaded Fleet System USR files and successfully converted them, including the embedded format commands. With the press of a key, you can opt for word-wrap or you can see an edge effect, the term for the white space that surrounds your text on the printed page.

The Write Stuff has many more features as well. To compare different versions of a file at the same time, you can opt for a split screen. TWS rivals GEOS and other graphics-based word processors by letting you print in double columns for simple desktop publish-

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ing. You can also add soft hyphens if you want words to get as close as possible to the right-hand margin but don't want to use justification.

The Write Stuff also supports the Super Graphix printer interface, RAM expanders, sorting by columns, file security, and alternate fonts such as Gazette programs Ultrafont+ (September 1986) or Excelfont 80 (June 1988). Writers and students should like its handy outliner. About the only feature this program doesn't have is a thesaurus.

One additional feature that comes only with the 64 version is Busy Bee Talker. BB Talker uses SAM (Software Automatic Mouth) from Tronix Software to read aloud anything you've written with BB Writer. This is a great feature for reading stories to children or for letting them create their own and having SAM read their stories to them.

The GEOS Substitute

If your old word processor seems outdated and if you'd like to upgrade to a newer one that can print different fonts and has graphics capabilities but you don't want to invest in GEOS, then take a look at Word Writer 6. This Timeworks program for the 64 and 128 in 40-column mode offers both plain and fancy word processing capabilities. You can print text in different size fonts and even insert small graphics.

Don't expect to rush through this word processor and become an expert the first time you try it. Word Writer can do much, but it's complicated and

takes time and effort to get up and running. It's not for children or the occasional user.

The 166-page manual says Word Writer is "a complete writing environment for memos, manuscripts, and everything in between." That may be true, but learning to use it takes some effort. It was like trying to install GEOS and making all those disks the first time out.

First off, you can't just boot up the disk and start typing. You have to make a backup disk containing all the files and fonts you think you'll need. That takes up a lot of space, so you can't store many documents on a disk. When the disk is full, you have no choice but to make another backup disk.

The manual does have a section for getting started quickly, and the program comes with a cheat sheet to help you become familiar with the commands. When you run the program, several help screens are available to acquaint you with various features.

Although the program supports a variety of printers, nothing is truly automatic. It took me an hour to get a sample text file printed correctly with a Super Graphix interface and Star SG-10 printer since that combination wasn't on the automatic-setup list.

The Final Word

When it comes to commercial word processors, this die-hard GEOS fan finds that she can crank them up and type faster with them than she can with geoWrite. I don't have to wait for the screen to redraw because I'm not using a graphics-based processor. I don't drop icons accidentally or have to reset them, trying to get proper margins, paragraph indents, and tabs on the exact spot. Also, what I see in the preview for both the 64 and the 128 is exactly what I'll get on the printed page.

I have to give up most of the fancy fonts I use with GEOS, and I'm confined to 12-point type unless I load external fonts. But that's not truly a problem. I find I do most of my work with standard typefaces and ASCII files anyway. Because I'm usually in a hurry and don't want to wait for all the disk saves and loads or for the screen to redraw, I often find I don't need the graphics or fancy fonts of geoWrite. I'm not saying goodbye to geoWrite; I'm just admitting that commercial word processors do make my life easier. □

Dorothy Hemme teaches high school in Sugar Land, Texas. Like any good teacher, this GEOS fan keeps an open mind to computing alternatives.

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GEOWIZARD

You have to expect something special from a program that bills itself as "the ultimate GEOS utility." But when you run this AUTOEXEC program, all you see is an innocuous dialog box telling you that geoWizard has been installed in your RAM. (You need at least 512K. Smaller RAM units can be used only at the expense of the RAM disk.)

That's about it. Life goes on as usual, and you might even forget that geoWizard's there. But when you press both buttons on the mouse (or a key combination if you use a joystick), geoWizard pops out of nowhere and shows its stuff. Whatever you're doing—working on a document or moving files around the deskTop—freezes, and a new command window opens at the top of the screen. This new menu offers a number of functions at the touch of a key combination. At this point, geoWizard is ready to go.

Press the Commodore key and the P key simultaneously to dump a screen to your printer. Such a screen dump is glaringly absent from the GEOS system. The routine will print both 40- and 80-column screens. On the geoWizard disk is a desk accessory that can increase the capabilities of the screen dump, allowing you to dump the image to a photo scrap or a geoPaint file. Pretty snazzy, but that's only the beginning of geoWizard's capabilities.

You can use another key combination to rescue you from those annoying system error dialog boxes. When you lock everything up, as long as the pointer is still moving on the screen (in oth-

er words, if GEOS can still read your input device), geoWizard is alive and kicking, ready to transport you back to the deskTop with your RAM disk intact. There's also a command to do a system reboot, which starts you over from scratch. Use this to recover from the most hopeless crashes.

All of this is great, but geoWizard has more amazing tricks up its disk sleeve. When you press the Commodore key and either L (for Load) or D (for Desk accessory), something extraordinary occurs. After presenting you with a file selection box (a much more efficient one than GEOS usually uses), geoWizard opens another program for you, right smack in the middle of whatever you're doing. The options allow you to run a desk accessory, an application, or an AUTOEXEC file without closing another application first. It's a lot like multitasking, and it can really speed things up.

Let me illustrate. If you're in the middle of a geoPublish session and you discover that you need to do some graphics work in geoPaint, you activate geoWizard. Press Commodore-L to load an application, select geoPaint from any active drive, and you're off. When you leave geoPaint, you'll be returned to where you left off in geoPublish. This powerful feature alone is worth the program's modest price.

As if that weren't enough, the geoWizard disk includes MiniDesk, a desk accessory that works some rather fine magic of its own. MiniDesk provides a scaled-down version of the deskTop, listing files by name instead of by icon and offering several es-

sential file-handling functions: copy, scratch, and rename. You can access any drive using MiniDesk, including drive C. While in geoPublish, for instance, you might discover that you've forgotten to place a text file on your work disk. No need to quit geoPublish when MiniDesk is around. The needed file can be retrieved from any drive and copied onto your work disk in seconds. If you're short of disk space, MiniDesk will let you clear nonessential files without leaving the comfort of your application.

All of these amazing feats don't come free. There are some compatibility problems because geoWizard breaks a few GEOS rules to work its wonders. There aren't many problems, however, and most of them are detailed in the documentation that comes on disk as a geoWrite document. If you use a utility that's on the disk to relocate the geoWizard code during boot-up, you can even avoid some of these problems.

Generally speaking, geoWizard may conflict with third-party programs that may also break rules by re-writing vectors or areas of memory that GEOS normally leaves vacant. One example is GateWay. There is some incompatibility, since GateWay's Switcher and geoWizard's multitasking fight over memory space. Such problems are rare, which is a tribute to Jim Collette's skills as a programmer.

In fact, the entire package is one of the finest pieces of user-written software I've ever seen. The program is as bug-free and user-proof as you can imagine. It cheerfully shows up whenever you call it and tidies up screen modes and disks be-

fore it leaves. The documentation is clear and complete, including honest information about possible pitfalls and a technical description of how the magic is done. Try it, and geoWizard, the ultimate utility for GEOS, will quickly become an indispensable part of your GEOS environment. You won't know how you got along without it.

STEVE VANDER ARK

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GEOSVIDEO

On the wall by my computer desk is a scrap of paper, torn from a notebook that has long since hit the circular file. On that piece of paper is a collection of scribbles—SYS commands, phone numbers, three-line programs, directory commands, and so on—that I've accumulated over the years. I keep telling myself that I'm going to print a nice, clean copy one of these days and throw away the messy version—but I know I never will.

That scrap of paper with its messy scrawl is one of the most valuable reference tools I have. It makes no difference that it looks like something blown into my yard from the dumpster across the street. It gives me information that I need.

In other words, it's not the package; it's the content. Keep that in mind when you look at geoVideo. This isn't software for your 64; it's a videotape tutorial for GEOS. It was put together by a group of people whose expertise is GEOS, not video.

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You might smile and say, "Yeah, but hey, they know what they're talking about," and you'd be right. Sort of.

This onscreen duo does know its subject, but the video has some problems. There are occasional cuts that clip off part of what's being said, and the poor image of the computer screen makes it difficult to see what's being described at times. There's the fact that the cursor has been redefined and doesn't remotely resemble the pointer novice users might expect to see on their own screens, but these blemishes are minor.

The real problems come from the fact that, even though these folks are obviously experts at GEOS, they don't impart that expertise in a logical sense. Instead, they ramble through a description of each application using the menus as a general guide, throwing in occasional tidbits of vaguely related information when the idea strikes them. To be fair, they do cover most of what you need to know about GEOS, but unless you're familiar with the program to begin with, you'll never be able to piece it together from geoVideo.

Which brings up another problem. Far too often the person explaining the program uses a keyboard shortcut to accomplish a task. Since the video shows only the monitor screen, the viewer can't see what is being demonstrated! Keyboard shortcuts are defined eventually, but not before they're used extensively and mysteriously. Of course, many GEOS users would know these shortcuts already and wouldn't be confused. Then again, those users wouldn't need geoVideo in the first place. The folks who do

need a video like this are the ones who gave up on GEOS the minute they saw a manual more than eight pages long. They need accurate, easy-to-follow instructions and information.

OK, OK, now I hear some people accusing me of nitpicking. Who cares if the cursor is shaped like the letter K instead of its usual pointer? And didn't I say that the video quality isn't all that important? Any user who watches geoVideo will get some information from it. It's very interesting to watch expert users put a powerful software package like this through its paces. And the quality of the screen image and commentary does occasionally shine, especially in the geoPaint tutorial. Even a jaded GEOS junkie like me can glean some pointers from other experts.

GEOS is a rich, powerful operating environment with a lot of possibilities. New users watching geoVideo will certainly get a feel for the immense capabilities of the system along with a healthy dose of information that they can use. But right away, we run into another problem. The information isn't always accurate.

Early in the video, it's stated that the geoRAM device is inserted into the user port; actually, it goes in the cartridge port. The Search and Title Page functions in geoWrite are obviously new to the expert trying to explain them, since she doesn't get them right. The strange effects of colors bleeding into each other, inherent in the Commodore high-resolution screen, seem to baffle the presenter as much as they would a new user. The Update function is erroneously declared to be unnecessary for

geoRAM users.

The list of inaccuracies goes on and on, and that's a problem—a big problem. The makers of this video should at the very least have planned exactly what they were going to say about each feature before they switched on the camera. Also, they should have researched the items that they were fuzzy about.

So what's the verdict? Is geoVideo worth the 20 bucks? That depends. Is it a complete tutorial? Pretty much. Is it accurate? Fairly. Is it interesting? For any GEOS nut, sure. Is it instructive? It's really too disjointed and assumes too much for most novices. If you're an intermediate user who'd like to see how that darn graphics importer really works or if you break out in hives when confronted with a hefty manual, geoVideo is worth a look-see.

I certainly compliment the makers on a good effort, but unfortunately, they have given us what amounts to a first draft that's still plagued with errors. What geoVideo needs is a good final edit.

STEVE VANDER ARK

geoVideo—\$20

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SID MASTER

"You know, looking at this program is about as exciting as looking at a belt sander," David Minnick said to his coreviewer wife, Robin.

"OK, but a belt sander is a handy thing to have around if you're building a bookcase," Robin replied.

SID Master is a modest-looking program—no fancy frills. Its manual has a sub-

dued, two-tone cover, basic Courier-style print, and computer-generated diagrams. Yet, like a belt sander that makes a tedious woodworking job easier, SID Master is a powerful addition that should be welcome in any programmer's toolkit.

Indy Software has recently lowered SID Master's price, and the manual alone is worth the modest cost. This is an excellent handbook for understanding sound, sound production, and the Commodore SID chip. Appendices in the manual contain listings of the SID registers, tables of decay and release times, and tables of frequency settings and sustain loudness levels. This information is available in Commodore's *Programmer's Reference Guide*, but it's nice to have it here in a manual dedicated to sound.

Let's take a look at some of the material covered in the manual. I think you'll agree that it's a great reference book.

The first chapter provides an overview of the program and is mandatory reading. Subsequent chapters expand on the properties of the SID chip, how it works, and how you can control it.

Chapter 2 deals with parameters applying directly to the SID chip's three independently controlled voices. Each parameter is defined and explained, followed by an example for experimentation. Parameters include frequency, pulse width, waveform, ring modulation, synchronization, and the envelope generator, which covers attack, sustain, decay, and release.

Filter parameters are covered in chapter 3. The filter is used to remove high, low, or middle frequencies of the waveform.

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REVIEWS

Chapter 4 explains the digital/analog meter that is displayed on SID Master's screen. The meter displays continuous output of the SID chip's four read-only registers. This chapter explains how the registers can be used to generate sound effects in conjunction with software links, parameters that control software in SID Master itself. Chapter 5 covers the creation of complex sounds with these software links.

Chapter 6 is the one most of us have been looking for. This is where you learn how to incorporate sound effects in BASIC programs. This chapter provides the background and mathematics necessary to enable you to take the sounds that you've created with SID Master and put them where you want them—in your own software.

The mathematics used to convert parameter values into bytes are presented in a BASIC program that does the work for you. In no time at all, we came up with a simple program using two sounds we created and the numbers in the manual for producing two other effects. Our short demonstration depicts an annoying noise, an aggravated assault upon the source of that sound, then enthusiastic applause, followed by authoritative retribution.

A defective power transformer near our house had been making an annoying ponging sound, so we used SID Master to develop a similar sound on the 64. Then we worked on applause. We modified a siren whose parameters were listed in the manual. Then we took the numbers listed for a gunshot effect. After converting these numbers to the appropriate POKes and adding some PRINT statements, we came up with a short program. Imagine that you are running this program, listening to the sounds and reading the text that appears on your monitor.

```
Sound:  PONG! PONG!
        PONG!
Text:   Will someone please
        shut that thing up?
Text:   Just a minute, honey.
        I have an idea.
Sound:  Gunshot.
Text:   Good shot!
Sound:  Applause.
Text:   Jolly good!
Sound:  Siren.
Text:   Uh oh!!!
```

OK, so we're not Jim Butterfield or even Arlan Levitan—but it worked, and so does SID Master.

Other programs let you play around with sound, helping you learn about

waveforms, pulse widths, and sound envelopes. SID Master takes you a step further by helping you to use the sounds that you create. As its name implies, it helps you master the SID chip.

Normally, when you try to program sound, you have to experiment, trying out different routines, poking in various values and settings. This process lets you alter only a few parameters at a time, checking the results one by one. SID Master lets you manipulate all of them at once. This makes creating and adjusting sound effects quicker and easier. All that remains is adding the numbers to your own programs. (SID Master is geared toward BASIC programming, but it wouldn't take many more steps to convert the numbers into hex to use SID Master with assembly language.)

There is an art to using SID Master efficiently. There are nuances to many of the steps. Certain delay times work better than others. You may find that you prefer some filters with certain kinds of waveforms over others, and getting just the right sound takes some fine-tuning. But that's the fun. Our favorite tools are those that are complex in ability yet simple to operate. They accomplish easily in seconds what would take us hours to do by hand. Their beauty and elegance lie in their ability to liberate us from time-consuming tasks. Just as a circular saw, a drill, and a belt sander are basic power tools of carpentry, a sprite editor, an assembler, and now SID Master are basic power tools of programming.

DAVID AND ROBIN MINNICK

Commodore 64 or 128—\$7

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CORRECTION

In the August issue, we published a review of S.E.C. Check Register 128. The version that was sent to our reviewer apparently was an early edition of the program. A spokesman from Sparks Electronics informs us that the current version has been upgraded and improved. New features have been added and earlier problems have been addressed. The price for the new version is \$24.95 plus \$3.00 shipping and handling, and the new address is Sparks Electronics, 5316 South Ninth Street, St. Joseph, Missouri 64504.

COMMODORE CLIPS

News, notes, and new products

Messiah Is Coming

Messiah III: Nemesis (about \$59) is a vast role-playing game for the 64/128 that should be available for Christmas. The game has more than one meg of code stuffed on three double-sided disks. Artists and programmers at Mad Man Software (7610 West Fifth Street, Suite 200, Lakewood, Colorado) have spent more than two years completing this project.



Messiah III features more than 300 scenes, 50 maps, and intelligent monsters.

Note that Messiah III is R-rated. It has violence, nudity, and adult situations. It's also a tough game to complete, designed for high-school intellectuals and up who have role-playing experience. Mad Man Software's Artificial Monster Intelligence System makes each monster fight in its own unique style. The Mad Man programmers claim that these are the smartest monsters that you've ever faced in a role-playing game.

CQ Computer Hams

Here's a useful product for 64/128 owners who are also ham radio operators. They can connect their computers to VHF hand-held or HF SSB transceivers and communicate via packet radio. MFJ Enterprises (P.O. Box 494, Mississippi State, Mississippi 39762; 800-647-5869) announces a fast, easy, and inexpensive way for hams to join the packet action.

The MFJ-1271 (\$49.95) modem plugs into your 64/128's cassette port and works both VHF packet at 1200 bps and HF packet at 300 bps. An adjustable threshold control helps reduce noise susceptibility to increase contact success. An LED is also included to let you know when you're receiving signals properly.

The MFJ-1271 also sports remote packet operation, mailboxlike message forwarding, and Net/ROM emulation, plus much more. It works with MFJ's Digicom/64 public domain software.



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a giant ten-dollar bill. Retail store owners can use Banner Cash to print sale banners. It also makes great birthday greetings. There are 245 Banner Cash dollars on each roll of paper.

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WORLD VIEW

Anders Reuterswärd

VIEW FROM GERMANY

Here is Europe calling again, with an extensive report from the Commodore scene in Germany. Since we don't yet have a German correspondent, I'll try to describe the Commodore situation from my viewpoint north of the border in Sweden.

I base my evaluation on what I gather from reading German computer magazines and the bulletin of Germany's popular GEOS Users Club (GUC), to which I belong.

Germany has always been the center of Commodore activity in Europe. Maybe Commodore fans in Britain will dispute my opinion, but no other European country has produced as much hardware and professional software for the 64 and 128 as has Germany. Also, almost all Commodore machines sold in Europe during the past few years have been assembled at Commodore factories in Germany.

It's only when it comes to games that the British Isles have been more productive than Germany, thanks in part to their close contacts with the large U.S. market. Also, most Germans aren't proficient in languages other than their own, making them dependent on domestic software or titles that have been translated.

One good example of this is GEOS, a software package that has reached high sales and a very high level of usage in Germany. This is mainly because the importer has taken the time to translate the entire GEOS line, software and manuals, into German.

The driving agent behind GEOS and Commodore activity in Germany is Markt & Technik. This company produces a large range of quality software and books, imports GEOS prod-

ucts, and publishes a Commodore magazine called *64'er*.

Even with the worldwide decline of the 8-bit machines, this monthly magazine still goes strong. Every issue is packed with articles, hardware and software reviews, construction projects, repair instructions, and type-in programs for the 64/128.

One new phenomenon in Germany is the GUC. With over 2000 members, a monthly bulletin, a large public domain library, and its own quality GEOS software, this club has quickly become a power on the Commodore scene. Unfortunately, this climb to the top hasn't been without clashes and controversies with the established market dominators, mainly Markt & Technik.

For fans elsewhere, GEOS products are available from the GUC at reasonable prices. How about GEOS on an EPROM? It boots instantly when you turn on the computer. TopDesk is an entirely new desktop that displays the contents of up to four drives at the same time. RamPrint is a printer routine that uses an REU as a printer buffer, leaving the computer free for other tasks while the printer trundles along. There's even more in the club's GEOS pipeline. If you're interested in learning about this group, drop a line to GEOS Users Club, Jurgen Heinisch, Xantener Strasse 40, D-4270 Dorsten 19 Rhade, Germany. He'll send you information about GUC membership.

There are still a lot of German mail-order firms catering to Commodore users. You can see many of their advertisements if you skim through the pages of computer magazines. There are word processors, database programs, CAD programs, paint programs, assemblers, terminal software, desktop publishing

programs, and games—all in the German language.

Perhaps true to their heritage, the Germans seem to specialize in hardware. Peripherals of all imaginable and some unimaginable kinds are available. Another quick look through computer magazines reveals advertisements for video digitizers, scanners (among them Handyscanner, which recently turned up on the U.S. market [COMPUTE, December 1990]), Prestel decoders, printer ribbon reinkers, MIDI interfaces, realtime clocks, satellite pay-TV decoders, printer interfaces, RS-232 interfaces, drive turbos, EPROM burners and cards, memory expansion units, cartridges, user port expanders, and more.

The list is long. The products are all for use with the 64 or 128, and they're all of domestic origin. Imported products such as Hard Drive and RAMLink from Creative Micro Design are available, but at much higher prices.

Regretfully, I don't have figures regarding the number of computers in Germany, but Amigas are taking over the market there as well as everywhere else in Europe. The rate of 8-bit decline, however, seems to be slower than it is in the U.S.

One reason for this is the recent merger of East and West Germany. That merger released a flood of computer-deprived East Germans onto the market. Their somewhat limited cash resources make used 64s and 128s perfect first computers. These new buyers should also help keep demand strong for software and add-on hardware.

I believe that Germany is a very fortunate country in this aspect and that the Commodore 8-bit computers will survive longer in that country than anywhere else. □

Commodore 8-bit computers will survive longer in Germany than anywhere else.

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Questions and
answers
about typewriter
emulations,
double-spaced listings,
and more

Bug-Swatter

Several readers wrote to complain about F/X Plot 128 (June 1992). The problem occurs when line 920 directs the program to a nonexistent line 170. The mistake was a renumbering error on our part. Line 920 should read as follows.

```
920 ON GK GOTO 930, 1450, 110, 990
```

Typewriter Emulator

Has anyone ever come up with a program that would convert a 64 and a printer into a typewriter? This would be nice for filling in blanks on printed forms.

STEPHEN LUISSE
NORTHAMPTON, PA

Here's a program that might work if your printer doesn't have a buffer.

```
10 OPEN 4,4,7
20 GET A$: IF A$ = "" THEN 20
30 PRINT$A$; GOTO 20
```

Most printers with buffers, however, save characters sent to them until they receive a carriage return. In this case, you'd be typing blindly until you hit Return, and then all letters would print at once.

If this program doesn't work as you'd like it to, try changing line 20.

```
20 INPUT A$
```

As you type, you'll see characters on the screen; press Return and the line will print. It's not exactly like a typewriter; you may have problems moving the printhead the proper number of spaces when filling in blanks.

Double-Spacing

Is there some way I can get a program listing to print double-spaced? It would be a break for my poor old eyes when it comes to debugging, but I

hate to fiddle with my printer's DIP switches.

G.W. BLACK
ATLANTA, GA

Here's a way you can do it with a program command. Load your program into memory, but when you enter the commands to produce a print-out of the listing, use a file number greater than 127. Here's an example. Enter the first line and press Return to start the listing. Enter the second line to close the file.

```
OPEN200,4:CMD200:LIST
PRINT#200:CLOSE200
```

Programs Within Programs

I have trouble loading programs from within another program. For example, I'll make a menu, it loads a program, and then there's an error. I used the clear command at the end of the menu, and that didn't work. Please help!

MICHAEL V. MAY
MT. PERRY, OH

Using BASIC for loading either another BASIC or machine code file is called chaining. To chain, your program must enter a LOAD command with the ,8 or ,8,1 extension just as if you'd entered it in direct mode. Within BASIC, however, the interpreter has a pointer that tells the 64 where to continue processing the program after a command has been executed. The pointer is reset to the start of the program when a LOAD is executed. This is actually a help when one BASIC program is loaded from another, since the new program overwrites the old and you want the new one to start running at the first line. When you want to load a machine language program, however, you run into a problem if you simply enter something like the code in the next two lines.

```
10 LOAD "MACHINE CODE",8,1
20 REM THE REST OF THE BASIC
PROGRAM FROM HERE
```

This results in an endless loop as the pointer is reset and the file named MACHINE CODE is loaded over and over again.

The solution is to set a flag that tells your program that it has already completed the loading and to continue running. Here's how the program above should look.

```
10 IF FL=0 THEN FL=255:LOAD
"MACHINE CODE",8,1
20 REM THE REST OF THE BASIC
PROGRAM GOES HERE
```

The flag, in this case, is held in the variable FL. When the program is first run, all possible numeric variables have a default value of 0. When we test whether or not FL is 0 initially, the condition is true. Because it's true, the line continues to process by setting FL to a value of 255 and loading the machine code file. (Any number other than 0 will work except in the case of a bad memory register, a rare event.) Now, when the pointer is reset and the condition is tested again, it's no longer true and processing continues on the next line.

Null Modems

I want to transfer some documents that I wrote on my 64 to my IBM computer. I know that I can upload them to a BBS and then download them to my IBM, but isn't there some way I can hook the two computers together without going through a third one by telephone?

WAYNE PALMER
CHICAGO, IL

Last month in a similar question we mentioned that some conversion is necessary to make the Commodore files

compatible with the character set of the receiving IBM computer. The 64 uses a nonstandard set of characters called PETSCII or PETSCII and the IBM uses the standard ASCII character set. (For more information about PETSCII, see the reply below to Frank Chang.)

For the 64, there are several conversion programs that will let you convert PETSCII to ASCII or ASCII to PETSCII. Some commercial word processors include a conversion program. Convert, for example, is one that comes with Word Writer. Check your local Commodore user group, bulletin board system, or national online services for a public domain conversion program.

The serial port on the back of the 64 is almost, but not quite, a standard RS-232 port; the only difference is the Commodore's voltage level. You can convert it by plugging in an RS-232 adapter, which is available from various suppliers.

Next, you'll need something called a null modem cable. This is just a simple cable that fools computers into thinking that they're linked by modem over a telephone line. A couple of the cable's wires are crossed so that an input line on one side is an output line on the other. One end plugs into the RS-232 adapter on the 64, and the other end plugs into the IBM's serial port. Null modem cables are available from several manufacturers, including The Grapevine Group, 3 Chestnut Street, Suffern, New York 10901; (800) 292-7445.

Finally, each computer will have to be running its own terminal software. The software must be set up to recognize a modem plugged into the serial port. Of course, there won't really be any modem attached, only the null modem

cable. Have the IBM request a download and then have the 64 upload the file. Also, be sure that the terminal programs are set for the same sending rates and other telecommunications parameters.

Commodore's ASCII

Just what is PET ASCII?

FRANK CHANG
RIDGEWOOD, NY

ASCII stands for the American Standard Code for Information Interchange. As the name suggests, it's a standard way of assigning computer character sets to specific values, 65 for the letter A, 66 for the letter B, and so on. It's often used with word processors when saving text to disk and for transmitting text from one computer to another.

Commodore devised its own number-to-character system when it released its original PET series of computers, hence the PET ASCII or PETSCII name. It is similar to ASCII, but there are differences. The most obvious difference is that uppercase letters in PETSCII print in lowercase in ASCII, and vice versa.

The 8-bit Commodore machines derive their character set from a time when ASCII wasn't the de facto standard that it is today and the big players took no pride in being compatible. Consequently, from the point of view of more modern machines, including the Amiga, the 8-bit Commodores not only confuse upper- and lowercase, but they neglect entirely such characters as the brace and underscore.

There's no problem when you are swapping sequential files with someone who owns another 8-bit Commodore, and modems do a good job of translating when you call a BBS that's running on an IBM. The problem becomes apparent when you download an AS-

SCII sequential file from an IBM and try to read it with a Commodore word processor or sequential file reader. If you get a file whose upper- and lowercase letters appear to be reversed, that's usually the reason. There are conversion programs available that translate the characters, enabling word processors to handle the text correctly.

Word processors such as SpeedScript add more complexity to the situation by using their own special codes. Instead of writing sequential files in ASCII or PETSCII, SpeedScript saves text as program files using Commodore screen codes.

If you're sending a SpeedScript file to someone who needs a PETSCII or true ASCII sequential file, you can overcome this problem by printing your SpeedScript file to disk rather than saving it by pressing f8 as you normally would. To print a file to disk, press Shift-Ctrl-P simultaneously. You'll be asked if you want to print to screen, disk, or printer. Select D for disk, and you'll have a PETSCII sequential file on disk.

SpeedScript can also print files as true ASCII. On the first line of your document, press Ctrl-E and then press A. This will print a lowercase reversed A on your screen. This code will change your SpeedScript file to true ASCII when you print to disk. You can easily test for this by printing your file to the screen instead of to a disk. All the upper- and lowercase letters will be reversed.

Converting documents to true ASCII can be useful when you want to send a SpeedScript document via modem to someone who has an IBM. The IBM user can then load your text into an ASCII-based word processor without additional converting. □

Comments about running a program from within a program, null modems, ASCII, and PETSCII

BEGINNER BASIC

Larry Cotton

MORE KEYS, PLEASE

Last month we learned about some keys unique to the 64. Let's examine some more.

When the 64 is first turned on, the keyboard defaults to what is known as the upper-case/graphic character set mode. Normally, anything you type is in uppercase. However, most keys can generate graphic characters by holding the Shift or Commodore key while pressing them.

Each keyboard character has a unique CHR\$ code, which you can see by entering PRINT ASC("X"), where X is the character itself. For instance, the ASCII code for J is 74. The codes for the symbols produced when holding down the Shift or Commodore key with J are 202 and 181, respectively. Conversely, to print any character onscreen, enter PRINT CHR\$(X) and then press Return, where X is the character's ASCII code. (Note that you don't need the quotation marks in this case.)

As you may have discovered by now, graphic characters can be used to enhance the appearance of your BASIC program screens. Here's a short example:

```
10 PRINTCHR$(147): REM CLEAR
    SCREEN
20 POKE 53280, 5: POKE 53281, 1:
    REM SET BORDER AND BACK-
    GROUND COLORS
30 POKE 646, 5: SET CURSOR
    COLOR
40 V=8: H=15: GOSUB 1000
50 PRINTCHR$(213)
60 V=8: FOR H=16 TO 22: GOSUB
    1000
70 PRINTCHR$(192): NEXT
80 V=8: H=23: GOSUB 1000
90 PRINTCHR$(201)
100 FOR V=9 TO 11: H=15:
    GOSUB 1000
110 PRINTCHR$(194): NEXT
120 FOR V=9 TO 11: H=23:
```

```
GOSUB 1000
130 PRINTCHR$(194): NEXT
140 V=12: H=15: GOSUB 1000
150 PRINTCHR$(202)
160 V=12: FOR H=16 TO 22:
    GOSUB 1000
170 PRINTCHR$(192): NEXT
180 V=12: H=23: GOSUB 1000
190 PRINTCHR$(203)
200 V=10: H=17: GOSUB 1000
210 PRINT"TITLE"
999 GOTO 999
1000 POKE 214, V: PRINT: POKE
    211, H: RETURN
1001 REM VERTICAL AND HORI-
    ZONTAL CURSOR POSITIONS
```

The numbers 214 and 211 in line 1000 are the memory registers that control cursor position. Admittedly, this technique creates a longer program, but I prefer it because it's precise and much easier to type in. Most programs can be shortened by printing the graphic characters themselves, but typing in such a program can be tedious.

The keyboard can be switched to the uppercase/lowercase character set by pressing the Commodore and Shift keys simultaneously. This allows the use of upper and lowercase in text, but unfortunately, it prohibits printing graphic characters on the same screen. Switching between character sets can be accomplished with PRINT CHR\$(14) (uppercase/lowercase) or PRINT CHR\$(142) (uppercase/graphic).

Some of the other keys peculiar to the 64 are the Ctr/Home, Inst/Del, Run/Stop, Ctrl, Commodore, and Restore keys. Let's look at each.

The Ctr/Home key, as I'm sure you have by now discovered, has a dual purpose: Unshifted, it brings the cursor home—to the upper left corner of the screen; shifted, it clears the screen completely. Ctr and Home CHR\$ codes are 147 and 19, respectively.

The Inst/Del key is used to

insert and delete characters. However, when entering BASIC programs, it's easy to be caught in what's known as the quote mode. This is where every inserted keystroke produces an arcane graphic symbol. The easiest way to escape this mode is to press a shifted Return.

The CHR\$ codes for Inst and Del are 148 and 20, respectively. These are useful to know when looking for specific characters to be entered.

The Run/Stop key is usually used (unshifted) to stop a BASIC program. Shifted, it's used to start loading a program from tape. The CHR\$ code for Stop is 3. Sensing a shifted Run/Stop key requires peeking at memory locations 197 and 653, as mentioned last month.

The Ctrl key's most useful function is to slow down a BASIC program listing. Use it with a number key to select one of eight cursor colors. As with other keys, it can be programmed to do other things. In SpeedScript 3.2, for instance, the Ctrl key is used with the E to erase words, sentences, and paragraphs.

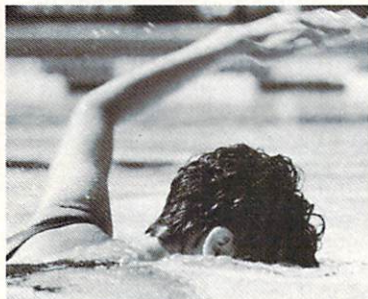
The Commodore key's main two default functions are switching between keyboard character sets (with the Shift key) and selecting eight additional cursor colors (with the number keys).

The Shift, Ctrl, and Commodore keys don't have ASCII codes. To prove it, try PRINT ASC("X"), where X is one of those keys. They can be sensed, however, as pointed out last month, by peeking at memory register 653.

Finally, we come to the Restore key. This is probably the most abused key on the 64. It's used with the Run/Stop key to restore the computer to its standard condition. It's designed to be struck, rather than just pressed. □

Here's a look at
some of the
unique keys found
only on 64
and 128 keyboards.

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G-19

MACHINE LANGUAGE

Jim Butterfield

DIRECTORIES

Programming to read a disk directory isn't trivial. You must go through a careful sequence of steps.

There are two approaches: read a fake BASIC program or read disk data in binary. Fake BASIC is invoked by opening with a filename such as \$0 and using secondary address 0. That's the option we'll take; it's simpler and more flexible.

You know that LOAD "\$0",8 will load a directory and LIST will display it. The LOAD command brings in a fake BASIC program, complete with pseudo line numbers, showing the size of each file. Instead of LOAD, we may open the file and use GET to pull in directory bytes one at a time. But we must know how to unscramble this programlike structure.

In a BASIC program—even the fake one used for directories—the first two bytes are the load address in binary. Then come the program lines.

Each line consists of a two-byte link, followed by a two-byte binary line number; these four bytes are followed by a string of characters terminated with a binary 0 character. When we read the directory, we check the link for 0, which will signal the end of the file. We save the line number, since it represents the file size in blocks, and scan through the remaining text. This text is not all filename; there may be leading spaces, quotation marks, and file type designations such as PRG or SEQ.

After putting the machine language code into memory, the BASIC program opens the file. Note that it uses a secondary address of 0. If desired, we can use pattern matching in the filename; for example, OPEN 1,8,0,"\$0:B*" would deliver only those filenames that begin with the letter B.

The job of reading the direc-

tory is done in the machine language program. First, it connects to the file; then it throws away the first two load bytes.

```
2000 LDX #01
      JSR $FFC6
      JSR $FFE4
      JSR $FFE4
```

Next, the program starts its main loop, which reads each directory line. The first two link bytes are tested for 0, then discarded.

```
200B JSR $FFE4
      STA $2100
      JSR $FFE4
      ORA $2100
      BEQ $2057
```

The next two bytes are the pseudo line number that represent the file size. We bring this in and store the two bytes. You'll often want to make use of this file size value; this program stores it but doesn't use it.

```
2019 JSR $FFE4
      STA $2101
      JSR $FFE4
      STA $2102
```

The remainder of the line contains text. We'll read this into memory, watching for the binary 0 that signals the end of the line.

```
      LDX #00
2027 STX $2100
      JSR $FFE4
      LDX $2100
      STA $2200,X
      TAY
      BEQ $2039
      INX
      BNE $2027
```

After receiving the line, we'll deliver it to the screen. It hasn't been neatly parsed for spaces or quotation marks, so it might look a little ragged. But you'll be able to see how the directory is read.

Before printing the line, we'll disconnect momentarily from the input channel.

```
2039 JSR $FFCC
      LDX #00
203E LDA $2200,X
      JSR $FFD2
      INX
      CPX $2100
      BCC $203E
```

A final return is printed, and then the program reconnects the input stream and goes back to do another line.

```
204A LDA #0D
      JSR $FFD2
      ; reconnect to the input
      stream
      LDX
      #01
      JSR $FFC6
      JMP $200B
```

When we're ready to quit, we just unhook the input channel and return to BASIC.

```
2057 JSR $FFCC
      RTS
```

Here's the program in BASIC.

```
100 DATA 162,1,32,198,255,32,
228,255,32,228,255
110 DATA 32,228,255,141,0,33,
32,228,255,13,0,33,240,62
120 DATA 32,228,255,141,1,33,
32,228,255,141,2,33,162,0
130 DATA 142,0,33,32,228,255,
174,0,33,157,0,34,168,
240,3,232,208,238
140 DATA 32,204,255,162,0,189,
0,34,32,210,255,
232,236,0,33,144,244
150 DATA 169,13,32,210,255,162,
1,32,198,255,76,11,
32,32,204,255,96
200 FOR J=8192 TO 8282
210 READ X
220 T=T+X
230 POKE J,X
240 NEXT J
250 IF T<>11245 THEN STOP
300 OPEN 1,8,0,"$0"
310 SYS 8192
320 CLOSE 1
```

Here's a way to use
a fake BASIC
program to read a
disk's directory.

D'IVERSIONS

Fred D'Ignazio

MY DREAM

The other night I awoke from a strange dream in which I'd been a computer program—a simulation. The authors of the program were monitoring the program and had just decided to terminate it, since it had outlived its usefulness. At that moment I woke up.

"Whew!" I sighed silently, noticing the comforting dark profile of my wife sleeping next to me. "That sure was weird!"

"What was weird?" came a small voice from inside my head.

I looked around the silent bedroom. No one else was there—just my wife and I. Who could have spoken?

"We're still watching you," came the reply.

"Who are you?" I whispered, casting a nervous glance at my sleeping wife.

"No one special. We're just monitoring your program. It's about to be terminated, you know."

Now I was deeply frightened. What was going on? Was I awake or not? Was this just another dream within my first dream?

"You're not really there," I whispered. No reply.

It was working. I continued, "You're just the product of a feverish mind. I've been sick recently, and you're just the residue of my fever."

Still no reply.

I glanced at the clock radio on the bedside table—3:00 a.m. I figured it was OK for me to settle down again and try to get some sleep. I closed my eyes again.

"We're still here."

I bolted out of bed. I sprinted for the bathroom door. Once inside, I shut the door and turned on the light. Staring back at me from the bathroom mirror was an extremely scared-looking face. I rushed to the toilet. No dream had ev-

er survived *this* test!

A few moments later, calmed and relieved, I switched off the bathroom light and returned to bed. I pulled the covers way up and fell almost instantly to sleep.

The voice returned. "If you don't believe me," it said, "watch this." I then saw a replay of parts of my life that I hadn't thought about in years. "It's all in the database," the voice said. "We know everything about you because we created you. And we created everything around you. But it's all about to end."

"But I'm alive!" I silently screamed. "How can you terminate me if I'm alive?"

"You only think you're alive," said the voice. "We programmed that feeling into you to make the simulation more interesting."

"But what about my wife here beside me?" I said quietly, gently nudging her sleeping form. Jeez, she sure seemed relaxed! She didn't have to be *that* relaxed, not with this drama being played out only inches away.

"Just part of the program," said the voice.

"And my kids?"

"Also the program."

"And this house? And our poor kitty who lived with us for 20 years before she wandered away last November? And a lady named Margaret who raised my brothers and sister and me? And the mean kid on the playground in the sixth grade who pushed me down the hill in front of my friends? And my three-legged dog?" (I was running out of memories.)

"The program."

Then I had an idea. "If all this is part of a program," I reasoned, "how come I have my own computer? In fact, how come I have a bunch of computers? Are they all part of the program, too?" I smirked in the darkness.

"You got it," said the voice. (Did I detect in that voice a faint trace of yet another smirk, mirroring my own?)

"OK," I whispered in despair. "You win. I am a program. My whole life is a program. My whole reality is a program. So when are you going to terminate me? Right here? Right now?"

"We're thinking about it," said the voice. "But you're turning out to have some unexpected uses. We'll let you know."

"When?" I thought. "When? When? When?"

I finally dozed off to sleep.

The next morning my wife asked me how I'd slept—the way she'd done for the last 23 years—and I just looked at her. How was I to tell her that I now had the notion that she was just a simulation, that I was just a simulation, and that our world was just someone's computer program?

Every day I look around and touch objects, sniff them, hold them, taste them, enjoy them. Are they real? Or are they just bits and bytes, subroutines and macros, tiny little pieces of the program of my life?

Is today the day I'll be terminated? Or tomorrow? Or not at all? Was it really just a dream?

I speculate about the future. Will technology ever become so advanced that we'll be able to embed parts of our consciousness into our virtual media and create virtual selves—little Fred programs, leading blissful lives on a computer-simulated landscape, interacting with fellow simulated beings all living in a virtual world?

Will these beings think they're real, too? Will they think they're alive? What happens when it comes time to terminate them and try something new?

Do we tell them before we pull the plug? □

If computer simulations mimic reality, how can we be sure that life itself isn't just a subroutine in some vast complex simulation?

Steve Vander Ark

DWEEZILS AND DRIVERS

Dave Ferguson is an accomplished GEOS programmer who has written several excellent utility programs for geoPaint. He's made them available on his Dweezil Disks, and I'm sure geoArtists will want to add them to their palette of tools. Here's a rundown of what the Dweezil Disks have to offer. In case you're curious, Dweezil is Ferguson's dog, and the disks are available from Quincy Softworks, 9479 East Whitmore Avenue, Hughson, California; 95326-9745. Write for a flier.

I love NewTools and its new toolbox. When activated from the menu in geoPaint, NewTools presents you with a large pointer that you use to designate a rectangular section of the bitmap. When you select a region, the cursor jumps automatically to the new toolbox (the regular toolbox is deactivated when NewTools works its magic).

From this toolbox you can perform a wide variety of strange but wonderful options. For example, one icon will slant your selected area upward at a 45-degree angle. Another will curve it—something I've always wished I could do to text in geoPublish!

NewTools also has a feature to put the finished results in boldface, adding pixels to the image. This is often necessary since some angle options tend to stretch the pixels apart. NewTools2, which operates in 64 or 128 mode, 40 or 80 columns, can be found on Ferguson's Dweezil Disk 1.

While geoPaint supports color, it's less of a hassle to work in monochrome. Besides, most users don't have a color printer anyway. When you're working in monochrome mode, patterns take on a new

importance. With the paintbrush tool set for various widths and patterns, you can create with a slew of shadings and simulated tints and hues.

UltiPatt and PattDA are two desk accessories that give you complete control over the patterns used in geoPaint. Each accessory includes a large selection of pattern sets that include some excellent gray scales. With UltiPatt, the sets are built right into the program; with PattDA, you load them from the disk in alternative patterns.

If you can't find a pattern you want from the 50 or so sets that are provided, you can use UltiPatt to create new ones. You can combine existing patterns, layering patterns on top of each other, or even use the program's random function to create new ones with the click of a button. UltiPatt and PattDA can be found on Dweezil Disk 2.

Marker is one more little Dweezil disk utility that comes in handy with geoPaint. It's a desk accessory that replaces geoPaint's ineffectual ruler tool. Marker not only reads the offset position in inches and pixels but also leaves a single-pixel mark when you press the M key. You'll find Marker on Dweezil Disk 1.

You won't want to miss geoStamp or its big brother, BigStamp, if for no other reason than that they are so darn much fun. The difference between the two programs is the size of the stamps they produce. BigStamp makes a stamp four times as large as geoStamp's. Where do the stamps come from? Well, a number of collections are included with the disk, and there are a few on QuantumLink. And with the included utilities you can copy stamp-sized chunks of a geoPaint bitmap into a collection or edit stamp images of your own.

The programs include a lot of well-thought-out commands, such as a key stroke to move the stamp one stamp width exactly in any direction, making borders a cinch. GeoStamp isn't on a Dweezil disk but is available separately from Quincy Softworks.

As long as we're on the subject of geoPaint programs, let me mention a few that are in Q-Link's library. A handy utility called Mirror Mirror lets you flip a geoPaint page side to side, resulting in a mirror image of your page. To download it easily from Q-Link, request MIRROR, uploaded by Red Storm.

Printing a geoPaint document is fairly straightforward, but there are print utilities that offer you some options. If you'd like a poster of your geoPaint or any GEOS page, try PosterPrint, a printer driver for Epson FX-80-compatible printers. PosterPrint enlarges the printout, turning one page into four. PosterPrint is available on Q-Link. Its filename is POSPR13.0.SDA, and it was uploaded by Irv Cobb.

Another print utility called Rotate Pages will take sections of a geoPaint page (perhaps converted from geoPublish via Paint Pages) and print them sideways. With a little planning you can create landscape-printed booklets using this program. You can find Rotate Pages on Q-Link as ROTPAGES, uploaded by Student 4th.

If you want to get a grayscale printout of a color geoPaint document, there are printer drivers on Q-Link that will do that for you. There are Epson versions for the 9-pin (EPSON9PINCOLOR) and 24-pin (EPSON24PINCOLOR and EPSON24PINGREY). Okimate 20 users should look for OKIMATE20GREY. All of these were uploaded by GeoRep GHW, the wizard of the printer drivers. □

Here are some new
geoPaint utilities
that artists will want
to add to their
palette of tools.

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(Formerly PowerPak)

Harness the productivity power of your 64 or 128!

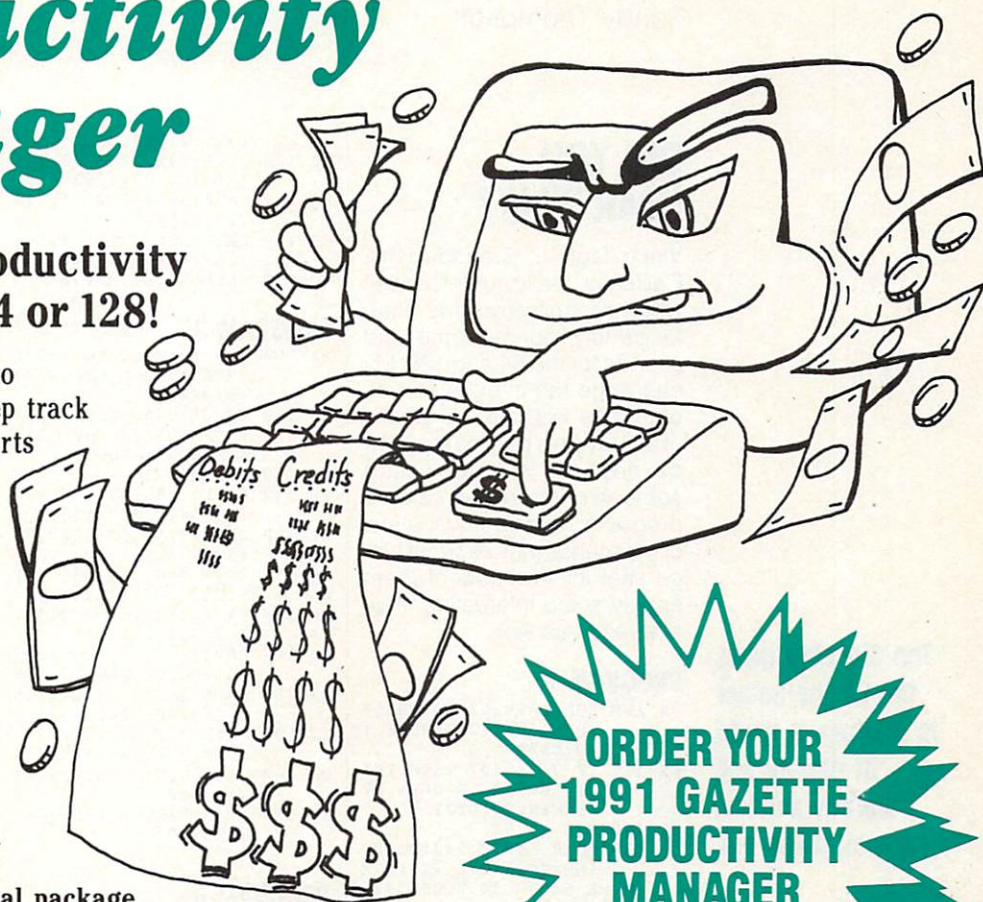
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PROGRAMMER'S PAGE

Randy Thompson

DID YOU HEAR THAT?

Vince Tagle of Granada Hills, California, really outdid himself when he answered my challenge to produce some wild sounds for the 64 and 128. My challenge ran in my April column, and within a few weeks of the article's publication, Vince fired off a letter listing some very strange-sounding programs. Here are just a few of the sounds (noises?) that Vince sent in. A couple of them supply some interesting visual effects, as well.

The SID chip gives the 64 the power to produce a world of earthly and unearthly sounds. Check these out.

PROGRAM 1

```
JX 100 FOR I=49152 TO 49258
:READ D:C=C+D:POKE I
,D:NEXT
KX 110 IF C<>16497 THEN PRI
NT "ERROR IN DATA ST
ATEMENTS":STOP
CP 120 SYS 49152
DA 130 POKE 54278,240:POKE
{SPACE}54276,129:POK
E 54273,34:POKE 5427
2,75
GK 140 FOR I=1 TO 15:POKE 5
4296,I:FOR J=1 TO 50
:NEXT:NEXT
MP 150 FOR I=15 TO 1 STEP -
1:POKE 54296,I:FOR J
=1 TO 200:NEXT:NEXT
SR 160 FOR I=1 TO 600+INT(R
ND(1)*1000):NEXT
KR 170 GOTO 130
XB 180 DATA 120,169,35,162,
192,141,20,3,142,21,
3,169,1,141,18,208,1
33,251,133,254
XH 190 DATA 173,17,208,41,1
27,141,17,208,169,12
9,141,26,208,88,96,1
73,25,208,141
JB 200 DATA 25,208,48,7,173
,13,220,88,76,49,234
,166,251,232,232,232
,232,232,232
CM 210 DATA 232,232,142,18,
208,134,251,228,254,
208,4,230,251,230,25
4,166,253
JX 220 DATA{2 SPACES}232,13
8,41,15,170,134,253,
189,91,192,141,22,20
8,76,188,254,200,201
QR 230 DATA 202,203,204,205
,206,207,207,206,205
,204,203,202,201,200
```

PROGRAM 2

```
EX 100 FOR I=49152 TO 49191
:READ D:POKE I,D:NEX
T:SYS 49152
HF 110 DATA 120,169,26,162,
```

```
192,141,20,3
KG 120 DATA 142,21,3,88,96,
120,169,234,162
EF 130 DATA 49,141,21,3,142
,20,3,88,96,32
SR 140 DATA 135,234,174,141
,2,224,1,240,246
HP 150 DATA 76,49,234,0
```

PROGRAM 3

```
BP 100 FOR I=49152 TO 49228
:READ D:C=C+D:POKE I
,D:NEXT
GS 110 IF C<>9456 THEN PRIN
T "ERROR IN DATA STA
TEMENTS":STOP
CP 120 SYS 49152
PX 130 DATA 120,169,43,162,
192,141,20,3,142,21
RF 140 DATA 3,162,25,169,0,
157,255,211,202,208
GP 150 DATA 250,169,63,141,
5,212,169,240,141,6
XF 160 DATA 212,169,17,141,
4,212,169,15,141,24
JD 170 DATA 212,88,96,166,2
03,224,64,240,18,169
SJ 180 DATA 17,141,4,212,16
5,211,105,14,141,1
XJ 190 DATA 212,141,0,212,7
6,49,234,169,16,141
DD 200 DATA 4,212,76,49,234
,23,212
KB 300 PRINT{DOWN}PRESS AN
Y KEY."
```

PROGRAM 4

```
CC 100 FOR I=49152 TO 49230
:READ D:C=C+D:POKE I
,D:NEXT
CH 110 IF C<>11843 THEN PRI
NT "ERROR IN DATA ST
ATEMENTS":STOP
CP 120 SYS 49152
MG 130 DATA 169,11,162,192,
141,6,3,142,7,3
EB 140 DATA 96,16,36,36,15,
48,32,201,255,240
GP 150 DATA 28,133,251,134,
252,132,254,166,253,
224
QB 160 DATA 5,240,7,169,5,1
33,253,32,210,255
DG 170 DATA 165,251,166,252
,164,254,76,36,167,1
33
PQ 180 DATA 251,134,252,132
,254,166,253,224,154
,240
DJ 190 DATA 7,169,154,133,2
53,32,210,255,165,25
1
PP 200 DATA 166,252,164,254
,76,243,166,208,14
```

PROGRAM 5

```
RS 100 FOR I=49152 TO 49266
:READ D:C=C+D:POKE I
,D:NEXT
EG 110 IF C<>13471 THEN PRI
NT "ERROR IN DATA ST
ATEMENTS":STOP
HK 120 POKE 16383,0:SYS 491
52
RJ 130 DATA 120,169,31,162,
```

```
192,141,20,3,142,21
BE 140 DATA 3,169,0,141,18,
208,173,17,208,41
KX 150 DATA 127,141,17,208,
169,129,141,26,208,8
8
AE 160 DATA 96,173,25,208,1
41,25,208,48,7,173
GS 170 DATA 13,220,88,76,49
,234,230,254,165,254
QP 180 DATA 41,3,208,21,166
,251,232,138,41,15
KR 190 DATA 133,251,170,189
,78,192,141,17,208,1
89,94,192
JC 200 DATA 141,22,208,76,1
88,254,24,25
AE 210 DATA 26,27,28,29,30,
31,31,30,29,28
FG 220 DATA 27,26,25,24,203
,204,205,206,207,206
GG 230 DATA 205,204,203,202
,201,200,200,201,202
,203,0,0,0,0,0
```

PROGRAM 6

```
BM 10 FOR I=54272 TO 54295:
POKE I,0:NEXT
HE 20 POKE 54296,15:POKE 54
277,8:POKE 54278,255:
POKE 54276,23:POKE 54
287,40
GB 30 FOR Z=1 TO 6
EB 40 FOR F1=255 TO 0 STEP
{SPACE}-6:POKE 54273,
F1:NEXT F1
EM 50 FOR F1=0 TO 255 STEP
{SPACE}20:POKE 54273,
F1:NEXT F1
SX 60 NEXT Z
CE 70 POKE 54278,15:POKE 54
296,0
```

PROGRAM 7

```
BM 10 FOR I=54272 TO 54295:
POKE I,0:NEXT
MX 20 POKE 54296,15:POKE 54
277,8:POKE 54278,255:
POKE 54276,23:F1=10
SM 30 FOR Z=1 TO 24:F2=30:P
OKE 54273,F1
RA 40 FOR Y=1 TO 10:POKE 54
287,F2:F2=F2*1.01:NEX
T Y
JC 50 F1=F1+8:NEXT Z
RE 60 POKE 54278,15:POKE 54
296,0
```

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SPEEDSPELLER 128

By Christopher Chojnacki

When SpeedScript 128 made its debut in October 1987, those of us who had been using SpeedScript for the 64 could hardly wait to try it out. This new version took advantage of most of the 128's abilities, but it still lacked two features that most word processors would call standard equipment: a spelling checker and a word counter.

True, programs exist that will take a SpeedScript file and either count its words or check its spelling, but they require an interruption of the creative process. You have to save your file, exit SpeedScript, load and run the spelling checker or word counter, save the corrected file, load SpeedScript again, and finally load the file once more. Now, there's a better way.

Getting Started

SpeedSpeller 128 is a two-part patch to SpeedScript 128 that adds a high-performance integrated spelling checker, a command line for viewing and changing the parameters of the spelling checker, a word counter, and a viewing mode that can double the number of onscreen lines.

The first part, SpeedSpeller 128, is written entirely in BASIC. To help avoid typing errors, enter it with The Automatic Proofreader; see "Typing Aids" elsewhere in this section. When you've finished typing it in, be sure to save the program.

The second part of the program is written in machine language. Enter it with MLX, our machine language entry program; see "Typing Aids" again. When MLX prompts, respond with the following values.

Starting address: 1300
Ending address: 1BEF

When you've finished typing, save this program with the filename ESC.PATCH.ML on the same disk as the first program. When SpeedSpeller 128 runs, it looks for and runs this file.

Running the Program

After you've saved both programs, reboot your 128 and run SpeedSpeller 128. You'll be presented with options

to install the patch to SpeedScript 128, change the device number for the dictionary files, or change the minimum word length to check for errors.

The first time you run SpeedSpeller, choose the first option by pressing the A key. At this point the patch's subroutine package loads into memory, and you're asked for the SpeedScript 128 filename and the device number of the drive where it's located. If you're using only one drive, be sure that the disk containing your version of SpeedScript 128 is in that drive before choosing a device number. After the patch is installed, you'll be asked for a filename to save your new version of SpeedScript 128.

Since SpeedSpeller supports numerous drives, you'll also be asked what device number you want for dictionary disks and the minimum word length to check for spelling errors. These values are then saved to disk in a file called ESC. Since this also contains subroutines used by the patch, ESC should be on the same disk as your new version of SpeedScript 128. Other options on the SpeedSpeller 128 main menu allow you to display and/or change the default values that you've already saved in the ESC file. When you're satisfied that everything is the way that you want it, you can load and run your new version of SpeedScript 128 just as you would your old one.

Changes

Although this new version of SpeedScript 128 doesn't look any different from the old one, there are some changes. For one thing, functions Control-A to change a letter's case and Control-X to transpose two letters no longer exist. They were removed to make room for the patch. Also, some functions have been switched back to the keys they were assigned to in the original version of SpeedScript. Specifically, Insert mode is now toggled using Control-I (or the Tab key), the Run/Stop key now inserts 5 spaces, and the Shift-Run/Stop combination inserts 255 spaces. The Esc key now gives you four new functions.

Integration

The Esc key, when used alone or together with the Shift, Alt, Control, or

Commodore (C=) keys, allows you to check the spelling of the file you have in memory, change your default values for the spelling checker, count the number of words in the file in memory, or toggle the length of the screen between 25 and 50 lines.

The first time that you use any of these new functions, it will be necessary to hold down any key being used with the Esc key for a few seconds while the patch loads in the subroutines from the disk. After that, all of the new functions will be ready to use instantly. Loading the subroutine package in separately from SpeedScript 128 itself makes it possible to upgrade or alter these new functions at some future time without having to alter SpeedScript 128 again in the process.

Check Your Spelling

To check the file you're working on for spelling errors, move the cursor to where you want the process to begin and press the Esc key. Your file is scanned from the cursor position to the end of the file for words that are at least as long as the value you set as your minimum word length.

Subdictionaries for each letter of the alphabet are then loaded into memory as necessary and used to check your file. If you don't have a subdictionary on your disk, you can load one from another disk or create one as you go along. If a word being checked doesn't appear in a subdictionary, the file scrolls to a point six words prior to the word in question. The word is displayed in reverse video at the top of the screen, and you're presented with a list of options.

Your first option is to add this word to your subdictionary by pressing the A key. Do this only if you know the word is spelled correctly. Your second option, to edit the word, is selected by pressing the E key. Type the word exactly as you want it to appear in your file, using capital letters where necessary. Finally, if you don't want to edit the word or add it to your subdictionary, you can skip the word by pressing the S key.

Be Aware

There are a few things to remember in general about this spelling checker.

The first is that SpeedSpeller 128 automatically cancels Insert mode. Similarly, the search and replace buffers are cleared anytime you use SpeedSpeller 128's Edit option. The next thing to remember is that words are not case sensitive. Therefore, *capital*, *Capital*, and *CAPITAL* all appear the same and are all checked using the same word in the C subdictionary. Also, contractions are viewed as two words. So *couldn't*, for example, will appear to be misspelled as *couldn*. You can abort the checking process at any time by pressing the Restore key and then pressing the N key when asked if you want to exit SpeedScript 128.

The chart below summarizes the changes that have been made.

Key Combination	Function
Esc	Check spelling
Alt-Esc	View/change default values
Control-Esc	View/change default values
C=-Esc	Toggle between 25 and 50 lines
Shift-Esc	Word-count
Run/Stop	Insert 5 spaces
Shift-Run/Stop	Insert 255 spaces
Control-I	Toggle Insert mode
Tab	Toggle Insert mode
Restore	Cancel spell-checking

File Management

Whenever SpeedSpeller 128 updates a subdictionary, it saves a temporary version of the new dictionary, verifies it, erases the old one, and then renames the temporary one. This is done to ensure that you don't accidentally lose or otherwise damage a subdictionary while updating it. For this reason, it's necessary to always have enough room left on a disk to have an extra copy of your largest subdictionary. Also, it's best not to save any documents with a single character as a filename, just to be sure that you don't inadvertently destroy a subdictionary.

Subdictionaries can be loaded into SpeedScript 128 and edited if you accidentally add a misspelled word. The file format is simple. The first letter of the file is the name of the file in reverse video. This is made by pressing the £

key while holding down the Control key and then pressing the letter that you want when asked to press a format key. Each word is then stored without the first letter and with the last letter in reverse video. No spaces separate the words, and no space or return is at the end of the file. For example, if the Z subdictionary contained the words *zany*, *zebra*, and *zipper*, it would look like this.

ZanVebr zipper

A subdictionary stored in this manner uses less space and can be loaded into memory faster.

Default Values

You can view at any time the default values for your subdictionary drive number and the minimum word length to check for spelling errors. Press the Esc key and either Alt or Control. To change these values, keep the Alt or Control key pressed down, release the Esc key, and press either the D key to cycle through device numbers 8-15 or the W key to cycle through word lengths of four to seven characters. These values remain in effect until you change them or turn off your computer.

Counting Words

Pressing the Esc key while holding down the Shift key counts all of the words in the file in memory in three seconds or less. There are a few things to consider, however, when using this function. The first is that contractions and hyphenated words are counted as multiple words. For example, *couldn't* is considered two words. Also, numbers are not counted as words.

Doubling Your Fun

Finally, we come to the last of SpeedSpeller 128's new features. By pressing the Esc key while holding down the Commodore (C=) key, you can toggle between SpeedScript 128's normal display of 25 lines and 50 lines of on-screen text.

This is possible by using what's known as Interlace Display mode. Unfortunately, not everyone will be able to use this feature. You'll need a good RGB monitor with a vertical-hold control. To reduce any flickering, try reducing the brightness of your monitor or us-

ing text and background color combinations that have a lower contrast.

If you exit and then reenter SpeedScript 128 while in this mode, you'll have to toggle this feature once to reset your display. Additionally, SpeedScript 128 will seem a little sluggish when using this mode because the program has to handle twice as much information every time it updates the screen. Also, because the computer's operating system doesn't recognize this mode, only the upper half of the screen will be used anytime you display a disk directory or print a file to the screen.

A Final Word

The type of disk drive that you use can either help or hinder a spelling checker's performance. The way that words are stored in a subdictionary is also a factor. SpeedCheck 128, the spelling checker on COMPUTE's SpeedScript disk, stores words in its dictionary in a random order. This means the entire subdictionary has to be checked from the beginning until it either finds the word it's looking for or runs out of words in the subdictionary. This process can be very fast or very slow.

SpeedSpeller 128, on the other hand, stores the words in its subdictionaries in alphabetical order and then uses what is known as a binary search to look for words. This method involves dividing each subdictionary in half and deciding in which half the word being checked should be found. This halving continues until either the word is located or the half is too small to be divided again. This process is very fast. The time required to check the spelling of a word will generally remain the same regardless of the word's location in the subdictionary, the size of the dictionary, or whether or not the word is in the dictionary.

Speaking of size, depending on how much memory your version of SpeedScript 128 uses, each subdictionary can contain approximately 7000 words. This means that an entire dictionary can contain about 182,000 words. In addition, because of the way SpeedSpeller 128 handles the loading and saving of subdictionaries, you don't have to keep all of your subdictionaries on a single disk.

SPEEDSPELLER 128

```
AD 0 POKE48,128:CLR:FAST:IFPEE
K(238)<>79THENPRINTCHR$(2
7)"X"
QF 1 PRINTCHR$(27)"R{7}
{2 HOME}{CLR}"CHR$(11)CHR
$(142):BA=PEEK(186)
CB 2 DEFFNMA(X)=PEEK(174)+256*
PEEK(175)
PK 3 PRINTSPC(12)"{17 SPACES}
{A}*****{S}
"
JK 4 PRINTSPC(12)"{5 SPACES}
{A}*****{X} SPEEDSP
ELLER{2 SPACES}128 {Z}***
*****{S}"
HB 5 PRINTSPC(12)"{A}*****{X} P
ATCH INSTALLATION AND MAI
NTENANCE PROGRAM {Z}***
{S}"
PJ 6 PRINTSPC(12)"{Z}*****
*****{X}"
JM 7 WINDOW12,7,66,22:PRINT"
{3}{CLR}":WINDOW13,8,65,2
1
CE 8 PRINT"{CLR}A) INSTALL PAT
CH TO SPEEDSCRIPT 128"
JA 9 PRINT"{DOWN}B) CHANGE DEV
ICE # FOR DICTIONARY"
EM 10 PRINT"{DOWN}C) CHANGE MI
NIMUM WORD-LENGTH"
DG 11 PRINT"{DOWN}CHOOSE AN OP
TION"
KQ 12 GETRS:IF((RS<"A")OR(RS>"
C"))THEN12:ELSEIFRS="B"TH
EN33:ELSEIFRS="C"THEN40
HK 13 BLOAD"ESC.PATCH.ML",U(BA
),B1,P4864:EA=FNMA(0)
MD 14 PRINT"{CLR}NAME OF SPEED
SCRIPT 128 VERSION TO CO
NVERT:":NS="":INPUTNS
BP 15 IF LEN(NS)<1 OR LEN(NS)>
16 THEN14
MF 16 INPUT"{DOWN}DEVICE # TO
{SPACE}LOAD VERSION FROM
(8 TO 15)":DV
HH 17 IF DV<8 OR DV>15 THENPRI
NT"{UP}"CHR$(27)"D{2 UP}
":GOTO16
FC 18 BLOAD(NS),U(DV),B1,P7169
:EB=FNMA(0)
HK 19 READS,E,KC:IFS=0THEN22
PC 20 CK=0:BANK1:FORX=STOF:REA
DN:CK=CK+N:POKEX,N:NEXT:
BANK0
HR 21 IFCK<>KCTHENPRINT"{DOWN}
ERROR IN DATA FOR LOCATI
ON(S)"S"TO"F:END:ELSE19
GG 22 PRINT"{DOWN}NAME FOR NEW
SPEEDSCRIPT 128 VERSION:
":NS="":INPUTNS
CR 23 IF LEN(NS)<1 OR LEN(NS)>
16 THENPRINT"{UP}"CHR$(2
7)"D{3 UP}":GOTO22
SK 24 INPUT"{DOWN}DEVICE # TO
{SPACE}SAVE NEW VERSION
```

```
{SPACE}TO (8 TO 15)":DV
JC 25 IF DV<8 OR DV>15 THENPRI
NT"{UP}"CHR$(27)"D{2 UP}
":GOTO24
BD 26 BSAVE(NS),U(DV),B1,P7169
TO P(EB):IFDS<>0THEN52
EC 27 INPUT"{DOWN}DEVICE # TO
{SPACE}LOAD DICTIONARY F
ROM (8 TO 15)":DD
RF 28 IF DD<8 OR DD>15 THENPRI
NT"{UP}"CHR$(27)"D{2 UP}
":GOTO27
SK 29 BANK1:POKE5150,DD:BANK0
RJ 30 INPUT"{DOWN}MINIMUM WORD
-LENGTH (4 TO 7)":WL
CH 31 IF WL<4 OR WL>7 THENPRIN
T"{UP}"CHR$(27)"D{2 UP}
":GOTO30
CK 32 BANK1:POKE5175,WL:BANK0:
GOTO47
AG 33 INPUT"{CLR}DEVICE # TO L
OAD 'ESC' SUBROUTINE FRO
M (8 TO 15)":DV
RB 34 IF DV<8 OR DV>15 THEN33
RX 35 BLOAD"ESC",U(DV),B1,P486
4:EA=FNMA(0):BANK1:DD=PE
EK(5150):BANK0
MJ 36 PRINT"{DOWN}DICTIONARY C
URRENTLY LOADED FROM DEV
ICE #DD
SE 37 INPUT"{DOWN}NEW DEVICE #
TO LOAD DICTIONARY FROM
(8 TO 15)":DD
EK 38 IF DD<8 OR DD>15 THENPRI
NT"{UP}"CHR$(27)"D{2 UP}
":GOTO37
GF 39 BANK1:POKE5150,DD:BANK0:
GOTO47
GG 40 INPUT"{CLR}DEVICE # TO L
OAD 'ESC' SUBROUTINE FRO
M (8 TO 15)":DV
DQ 41 IF DV<8 OR DV>15 THEN40
AH 42 BLOAD"ESC",U(DV),B1,P486
4:EA=FNMA(0):BANK1:WL=PE
EK(5175):BANK0
RM 43 PRINT"{DOWN}CURRENT MINI
MUM WORD-LENGTH:WL
PD 44 INPUT"{DOWN}NEW MINIMUM
{SPACE}WORD-LENGTH (4 TO
7)":WL
HH 45 IF WL<4 OR WL>7 THENPRIN
T"{UP}"CHR$(27)"D{2 UP}
":GOTO44
JG 46 BANK1:POKE5175,WL:BANK0
ER 47 SCRATCH"ESC",U(DV):IFDS>
1THEN52
HS 48 BSAVE"ESC",U(DV),B1,P486
4 TO P(EB):IFDS<>0THEN52
EX 49 SCRATCH"ESC",U(DV):IFDS>
1THEN52
QA 50 RENAME"ESC",U(DV)TO"ESC"
,U(DV):IFDS<>0THEN52
RM 51 BANK0:POKE7167,0:PRINT"
{2 HOME}{CLR}{DOWN}ALL F
INISHED!":BANK15:POKE48,
4:CLR:SLOW:END
AK 52 BANK0:POKE7167,0:PRINT"
{DOWN}ERROR: "DSS:BANK15
```

```
:POKE48,4:CLR:SLOW:END
DS 53 DATA 7280,7281,281,254,2
7
FP 54 DATA 7283,7284,281,254,2
7
AK 55 DATA 8181,8181,3,3
KR 56 DATA 8187,8187,255,255
XD 57 DATA 8221,8222,219,177,4
2
DJ 58 DATA 8245,8246,208,172,3
6
RJ 59 DATA 8265,8266,136,99,37
AF 60 DATA 9833,9833,80,80
FM 61 DATA 10109,10109,79,79
CB 62 DATA 10334,10335,206,166
,40
SM 63 DATA 10930,10993,8169
JM 64 DATA 173,255,27,201,204,
240,36,169
FP 65 DATA 3,162,224,160,42,32
,189,255
HD 66 DATA 169,0,170,32,104,25
5,173,3
BG 67 DATA 40,170,168,32,186,2
55,169,0
EE 68 DATA 32,213,255,144,3,76
,69,48
HS 69 DATA 32,204,255,108,0,19
,69,83
QD 70 DATA 67,234,160,0,185,70
,53,240
BX 71 DATA 6,32,210,255,200,20
8,245,96
CH 72 DATA 12350,12350,228,228
GA 73 DATA 0,0,0
```

ESC.PATCH.ML

```
1300:58 14 53 10 05 05 04 53 5A
1308:10 05 0C 0C 05 12 20 31 9B
1310:32 38 3A 20 00 53 30 3A 8E
1318:20 52 30 3A 20 3D 20 53 16
1320:03 01 0E 0E 09 0E 07 20 59
1328:44 0F 03 15 0D 05 0E 14 92
1330:2E 2E 2E 00 43 08 05 03 06
1338:0B 09 0E 07 20 27 20 27 5D
1340:20 57 0F 12 04 13 2E 2E 46
1348:2E 00 55 0E 0B 0E 0F 17 D6
1350:0E 20 57 0F 12 04 20 2D 6F
1358:20 00 20 20 41 04 04 2C E2
1360:20 45 04 09 14 20 0F 12 4A
1368:20 53 0B 09 10 3F 00 44 27
1370:0F 0E 05 20 43 08 05 03 8B
1378:0B 09 0E 07 00 53 01 16 FD
1380:05 20 55 10 04 01 14 05 2E
1388:04 20 53 15 02 2D 44 09 CA
1390:03 14 09 0F 0E 01 12 19 01
1398:20 28 59 2F 4E 29 3F 00 8C
13A0:29 20 44 15 12 09 0E 07 15
13A8:20 53 15 02 2D 44 09 03 06
13B0:14 09 0F 0E 01 12 19 20 88
13B8:00 4C 0F 01 04 00 53 01 AB
13C0:16 05 00 3A 20 54 12 19 66
13C8:20 41 07 01 09 0E 20 28 29
13D0:59 2F 4E 29 3F 00 43 0F 5B
13D8:12 12 05 03 14 20 53 10 35
13E0:05 0C 0C 09 0E 07 3A 20 BF
13E8:00 45 12 12 0F 12 20 28 EC
13F0:00 53 10 05 05 04 43 0F 0C
```


PROGRAMS

13F8:15	0E	14	05	12	20	31	32	A5	1628:3F	18	D0	05	20	77	18	B0	24	1858:A0	13	20	BD	FF	A9	00	A2	C6
1400:38	3A	20	00	20	57	0F	12	65	1630:F6	A9	00	F0	DF	AD	3E	13	96	1860:00	20	68	FF	A9	00	AE	1E	6E
1408:04	13	00	43	12	05	01	14	E5	1638:29	BF	CD	00	0C	D0	B9	20	D9	1868:14	A0	00	20	BA	FF	60	A6	0A
1410:05	20	41	00	44	05	16	09	56	1640:B5	19	8A	D0	05	AD	00	0B	D5	1870:B0	A4	B1	20	D5	FF	60	AD	77
1418:03	05	20	23	3A	00	08	20	3B	1648:D0	AF	8D	FF	0B	A5	29	48	04	1878:3E	13	09	80	8D	3E	13	8D	CE
1420:20	20	4D	09	0E	09	0D	15	5E	1650:A5	2A	48	20	1F	21	20	1F	C1	1880:18	13	20	CD	18	B0	45	20	90
1428:00	20	57	0F	12	04	2D	4C	02	1658:21	20	1F	21	20	1F	21	20	F2	1888:54	18	A9	B0	A6	45	A4	46	03
1430:05	0E	07	14	08	3A	00	04	AD	1660:1F	21	20	1F	21	A5	29	8D	D9	1890:20	D8	FF	20	EE	18	B0	34	76
1438:04	3B	05	04	06	32	07	36	4F	1668:13	35	A5	2A	8D	14	35	68	52	1898:20	54	18	20	EE	18	B0	2C	58
1440:08	03	19	07	12	30	13	00	38	1670:85	2A	68	85	29	20	C9	16	C2	18A0:A9	01	20	6F	18	20	EE	18	18
1448:20	20	21	00	18	80	20	60	10	1678:20	52	1D	20	C9	16	20	CB	A1	18A8:B0	22	AD	3E	13	29	7F	8D	1D
1450:19	08	32	30	DE	1B	DE	1B	8C	1680:1E	A9	4A	A0	13	20	18	1E	E0	18B0:18	13	20	CD	18	B0	15	AD	ED
1458:A5	D3	48	A9	CC	8D	FF	1B	A3	1688:20	E5	16	A9	56	A0	13	20	17	18B8:18	13	8D	1C	13	AD	3E	13	0C
1460:20	CB	1E	20	52	1D	68	F0	1A	1690:18	1E	20	04	17	20	52	1D	8F	18C0:8D	1E	13	A9	06	A2	19	A0	C9
1468:15	4A	B0	0F	4A	B0	09	4A	26	1698:20	CB	1E	A9	02	A0	13	20	FE	18C8:13	20	D3	18	60	A9	04	A2	DA
1470:B0	03	4C	B1	1A	4C	B1	1A	D5	16A0:18	1E	A9	34	A0	13	20	18	82	18D0:15	A0	13	20	BD	FF	A2	00	4B
1478:4C	28	1B	4C	81	14	4C	12	FF	16A8:1E	18	90	99	A0	00	A9	29	17	18D8:20	68	FF	A9	0F	AE	1E	14	51
1480:15	20	CB	1E	A9	F1	A0	13	FF	16B0:A2	01	20	74	FF	30	0E	29	BF	18E0:A8	20	BA	FF	20	C0	FF	20	E8
1488:20	18	1E	A5	29	48	A5	2A	C4	16B8:3F	F0	0A	C9	1B	10	06	99	5D	18E8:E7	FF	20	EE	18	60	A9	00	95
1490:48	A9	00	85	64	85	65	85	29	16C0:00	0C	C8	D0	E9	8C	00	0B	A2	18F0:20	BD	FF	A9	0F	AE	1E	14	BE
1498:29	A9	04	85	2A	20	AC	16	D9	16C8:60	A0	00	A9	29	A2	01	20	DD	18F8:A8	20	BA	FF	20	C0	FF	A2	83
14A0:C0	00	F0	07	E6	65	D0	04	2A	16D0:74	FF	49	80	A2	29	8E	B9	F8	1900:0F	20	C6	FF	90	24	A9	01	04
14A8:E6	64	88	C8	98	18	65	29	14	16D8:02	A2	01	20	77	FF	C8	CC	EA	1908:8D	00	FF	A0	FF	C8	B9	7D	1F
14B0:85	29	A5	2A	69	00	85	2A	BD	16E0:00	0B	D0	E7	60	A0	00	A9	97	1910:48	99	03	0D	10	F7	49	80	71
14B8:A5	29	38	ED	18	35	A5	2A	EE	16E8:29	A2	01	20	74	FF	99	00	4B	1918:8D	00	0D	99	03	0D	A9	2C	18
14C0:ED	19	35	90	D8	68	85	2A	73	16F0:0D	CC	00	0B	F0	03	C8	D0	7D	1920:99	04	0D	A9	0E	8D	00	FF	03
14C8:68	85	29	A2	13	A5	65	C9	99	16F8:EE	A9	00	99	00	0D	A0	0D	23	1928:00	12	A0	00	20	CF	FF	99	35
14D0:01	D0	06	A5	64	D0	05	A2	DB	1700:20	18	1E	60	A9	00	8D	FE	75	1930:00	0D	C8	C9	0D	D0	F5	A9	9C
14D8:20	8E	09	14	78	20	3D	1D	F2	1708:0B	AC	00	0B	88	98	18	65	D3	1938:00	99	00	0D	20	CC	FF	20	F5
14E0:A9	00	8D	00	FF	38	A5	FE	BA	1710:45	85	43	A5	46	69	00	85	62	1940:E7	FF	AD	00	0D	C9	31	10	1E
14E8:A2	90	38	20	75	8C	20	44	F1	1718:44	A5	43	38	E9	FE	A5	44	98	1948:02	18	60	20	CB	1E	A9	E9	A3
14F0:8E	A0	00	B9	00	01	F0	06	10	1720:E9	FE	B0	07	EE	FE	0B	A9	BC	1950:A0	13	20	18	1E	A0	02	C8	5D
14F8:20	0C	1D	C8	D0	F5	A9	0E	24	1728:5C	D0	02	A9	61	A0	13	20	67	1958:B9	00	0D	C9	41	30	F8	98	FA
1500:8D	00	FF	20	1C	1D	58	A9	A2	1730:18	1E	20	E4	FF	D0	FB	20	9F	1960:AA	C8	B9	00	0D	C9	2C	D0	0A
1508:04	A0	14	20	18	1E	EE	15	0D	1738:E4	FF	F0	FB	C9	53	D0	01	F4	1968:F8	A9	00	99	00	0D	8A	A0	05
1510:35	60	A9	00	8D	16	35	20	71	1740:60	C9	45	D0	4A	20	CB	1E	4F	1970:0D	20	18	1E	A9	A0	A0	13	3A
1518:CB	1E	A9	02	A0	13	20	18	AE	1748:A9	D6	A0	13	20	18	1E	A9	8D	1978:20	18	1E	A9	B9	AE	FD	0B	AE
1520:1E	A9	1F	A0	13	20	18	1E	19	1750:12	20	83	27	8D	B5	35	A8	C8	1980:F0	02	A9	BE	A0	13	20	18	76
1528:AE	10	12	86	B0	AE	11	12	CC	1758:F0	F5	88	B9	46	35	99	B6	1A	1988:1E	A9	C3	A0	13	20	18	1E	1E
1530:08	86	B1	A9	00	A8	99	00	17	1760:35	C0	00	D0	F5	AD	00	0B	D7	1990:38	60	EE	15	35	A5	3F	85	6A
1538:0B	C8	D0	FA	AD	13	35	8D	95	1768:8D	96	35	A5	29	85	9E	A5	46	1998:29	A5	40	85	2A	AD	40	0B	BC
1540:40	0B	AD	14	35	8D	41	0B	B1	1770:2A	85	9F	20	8A	31	AD	B5	35	19A0:8D	13	35	AD	41	0B	8D	14	45
1548:A5	29	85	3F	A5	2A	85	40	55	1778:35	8D	00	0B	18	2E	B5	35	6F	19A8:35	A9	00	8D	96	35	8D	B5	13
1550:E6	29	D0	02	E6	2A	20	1F	B1	1780:A5	29	38	ED	B5	35	85	29	68	19B0:35	20	52	1D	60	A5	B0	85	22
1558:21	A5	29	85	41	A5	2A	85	74	1788:A5	2A	E9	00	85	2A	60	C9	B0	19B8:47	A5	B1	85	48	A5	45	85	6F
1560:42	20	AC	16	C0	00	D0	01	53	1790:41	D0	9F	A9	01	8D	FD	0B	67	19C0:49	A5	46	85	4A	A9	3F	8D	27
1568:C8	98	18	65	29	85	29	A5	CD	1798:A9	3F	8D	00	FF	AE	FF	0B	E2	19C8:00	FF	20	18	1A	E0	00	D0	A5
1570:2A	69	00	85	2A	CC	37	14	69	17A0:E8	D0	28	A5	45	85	FE	A5	BA	19D0:28	A0	01	B1	FE	AA	29	1F	8E
1578:30	07	AD	00	0C	A8	99	00	68	17A8:46	85	FF	A0	01	B9	00	0C	60	19D8:D9	00	0C	30	23	D0	09	C8	B3
1580:0B	A5	29	38	ED	18	35	A5	22	17B0:91	FE	C8	CC	00	0B	D0	F5	11	19E0:8A	30	0F	CC	00	0B	D0	EB	CC
1588:2A	ED	19	35	90	D3	A0	01	CF	17B8:88	09	80	91	FE	A5	43	85	31	19E8:A5	FE	85	49	A5	FF	85	4A	75
1590:B9	00	0B	D0	13	C8	C0	1B	5E	17C0:45	A5	44	85	46	A9	0E	8D	5E	19F0:D0	D8	CC	00	0B	D0	0E	A2	B5
1598:D0	F6	20	CB	1E	A9	6F	A0	C0	17C8:00	FF	60	A5	45	38	E5	26	5A	19F8:00	A9	0E	8D	00	FF	60	C8	B9
15A0:13	20	18	1E	20	92	19	60	1F	17D0:85	B4	A5	46	E5	27	85	B5	94	1A00:B1	FE	10	FB	C8	88	98	18	40
15A8:09	40	F0	E2	8D	3E	13	A9	E8	17D8:AC	00	0B	88	98	18	65	26	5D	1A08:65	FE	85	47	85	26	A5	FF	E3
15B0:00	99	00	0B	8D	FD	0B	20	8C	17E0:85	9E	A5	27	69	00	85	9F	96	1A10:69	00	85	48	85	27	D0	B2	4B
15B8:CB	1E	A9	02	A0	13	20	18	4F	17E8:A5	B5	AA	18	65	27	85	51	52	1A18:A5	47	18	65	49	85	26	A5	9C
15C0:1E	A9	34	A0	13	20	18	1E	5C	17F0:A5	26	85	50	18	8A	65	9F	86	1A20:48	65	4A	85	27	66	27	66	FA
15C8:20	54	18	A9	00	20	6F	18	2D	17F8:85	25	A5	9E	85	24	E8	A4	05	1A28:26	A2	01	A5	26	C5	47	D0	3A
15D0:90	0D	20	EE	18	20	3F	18	51	1800:B4	D0	04	F0	0B	A0	FF	B1	DA	1A30:13	A5	27	C5	48	D0	0D	C5	FD
15D8:F0	DD	20	79	1A	D0	BB	86	A0	1808:50	91	24	88	C0	FF	D0	F7	71	1A38:46	D0	08	A5	26	C5	45	D0	C2
15E0:45	84	46	A5	41	85	29	A5	0A	1810:C6	51	C6	25	CA	D0	EE</											


```

1A88:18 1E A9 89 A0 13 20 18 C7
1A90:1E 20 3F 18 D0 1A AD 3E CD
1A98:13 49 C0 A0 00 91 B0 A5 18
1AA0:B0 18 69 01 85 AE AA A5 52
1AA8:B1 69 00 85 AF A8 C4 AF C1
1AB0:60 20 CB 1E A9 02 A0 13 22
1AB8:20 18 1E A9 AD A0 13 20 97
1AC0:18 1E A9 14 A0 14 20 18 AC
1AC8:1E AD 1E 14 AA C9 0A 30 3D
1AD0:0B A9 31 20 0C 1D 8A 18 1F
1AD8:69 26 D0 07 49 30 20 0C 2D
1AE0:1D A9 20 20 0C 1D A9 1F 5B
1AE8:A0 14 20 18 1E AD 37 14 22
1AF0:49 30 20 0C 1D EE 15 35 9E
1AF8:A5 D3 F0 2B 20 E4 FF F0 4B
1B00:F7 29 1F C9 04 D0 0E AE 2B
1B08:1E 14 E8 8A 09 08 29 0F E1
1B10:8D 1E 14 D0 9C C9 17 D0 2F
1B18:DF AE 37 14 E8 8A 09 04 99
1B20:29 07 8D 37 14 D0 8A 60 2B
1B28:78 AD 4E 14 8D 4F 14 49 2C
1B30:40 8D 4E 14 AD 45 14 8D 2D
1B38:49 14 49 10 8D 45 14 AD 99
1B40:50 14 8D 52 14 49 2B 8D 24
1B48:50 14 AD 51 14 8D 53 14 08
1B50:49 38 8D 51 14 CD 2F 0A 40
1B58:F0 26 A0 00 BE 38 14 C8 6C
1B60:B9 38 14 C8 20 07 1D C0 A8
1B68:16 D0 F1 A9 FF A0 10 A2 FB
1B70:1E 20 07 1D 88 D0 FA AD 9B
1B78:50 14 4A 90 03 20 79 E1 9B
1B80:AD 54 14 AE CF 21 8D CF FD
1B88:21 8E 54 14 AD 55 14 AE 58
1B90:D0 21 8D D0 21 8E 55 14 38
1B98:AD 56 14 AE E1 21 8D E1 39
1BA0:21 8E 56 14 AD 57 14 AE B8
1BA8:E2 21 8D E2 21 8E 57 14 7E
1BB0:AD 50 14 8D B0 1D AD 51 D3
1BB8:14 8D 2F 0A 8D 32 26 8D F1
1BC0:52 26 8D 85 26 8D 93 27 69
1BC8:AD 4E 14 8D 33 26 AD 13 65
1BD0:35 85 29 AD 14 35 85 2A AD
1BD8:20 2E 26 20 52 1E AD E6 BE
1BE0:21 0A 0A 0A 0A 0D D2 21 57
1BE8:A2 1A 20 07 1D 58 60 00 76

```

Christopher Chojnacki is a hotel security officer in Port Huron, Michigan. He plans to upgrade his 128 system with the addition of a RAMDrive, a color printer, and a mouse.

LA BASIC

By Farid Ahmad

One of the shortcomings of 64 BASIC is that it doesn't allow the use of labels. A label is a subroutine that is assigned a descriptive name rather than a line number or address. To run the subroutine, you simply call the label by its name. Such a feature makes a program easy to write and even easier to modify.

La BASIC adds this facility to BASIC. It allows the use of labels with GOTO, GOSUB, and RESTORE. In addition, it pro-

vides two new commands for easy cursor positioning and color control.

Getting Started

La BASIC is written entirely in machine language. To enter it, use MLX, our machine language entry program; see "Typing Aids" elsewhere in this section. When MLX prompts, respond with the following values.

Starting address: C000
Ending address: C337

Be sure to save a copy of La BASIC before you exit MLX.

Labels

A label consists of a REM statement in the following format.

REM=label

The equal sign (=) distinguishes a label in La BASIC from an ordinary REM statement. Note that there is no space between the REM and the equal sign. A space after the equal sign will be treated as a part of the label. Labels may be up to 27 characters in length and may use any character except quotation marks. Labels may also include BASIC keywords.

The actual BASIC subroutine would immediately follow. The keyword *RETURN* would mark the end of the routine. Here's a very simple example.

```

500 REM=PAUSE
510 FOR P=1 TO 3000: NEXT
520 RETURN

```

Whenever you'd like for the program to pause for a few seconds, you could call the PAUSE label with La BASIC's commands.

La BASIC Commands

The following commands are available in La BASIC.

SYS 49152, 0

This command has no parameters. It must be used at the beginning of a program before any labels are used. It searches through the entire program for labels and sets up a table of them, their line numbers, and their addresses in a separate area of memory. By de-

fault, the memory under Kernal ROM is used, but it can be changed as described later.

SYS 49152, 1, label

This is the GOTO command. It transfers program control to the line that contains the label. The label parameter may be any legal BASIC string, character variable, or a combination of these. For example, suppose a program contains a label such as REM=DRAW TITLE. This could be called with any of the following statements.

```

SYS 49152, 1, "DRAW TITLE"
T$="DRAW TITLE": SYS 49152, 1, T$
A$="DRAW": SYS 49152, 1, A$+" TITLE"

```

SYS 49152, 2, label

This is the GOSUB command. It works like the normal GOSUB, except that control is transferred to the subroutine that starts with the specified label. The subroutine should end with a RETURN statement as usual. The label can be specified as shown previously.

SYS 49152, 5, label

This is a selective RESTORE. After this command is executed, the DATA pointer will be set to the line containing the label. The label can be specified as with the previous command.

The remaining two commands don't use labels. However, they make programming easier.

SYS 49152, 3(row, column, color)

Note that there is no closing parenthesis. This command will clear the screen, position the cursor at the specified row and column, and set the text color. The row may be from 0 to 24, and the column from 0 to 39. Values outside this range produce an ILLEGAL QUANTITY ERROR.

SYS 49152, 4(row, column, color)

This command is similar to the previous one, except that the screen isn't cleared before positioning the cursor.

The color parameter may be used in two ways. If you want to change the printing color without changing the text already onscreen, use any Commodore color number from 0 to 15. For example, SYS 49152, 4(0, 0, 1 will change the printing color to white.

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If you want the color change to affect the text that is already on the screen, add 100 to the color number. SYS 49152, 4(0, 0, 101 will change the color of all the onscreen text to white and make white the printing color.

In both of the above commands, the color parameter is optional. If you don't wish to change the text color, leave out this parameter as well as the preceding comma.

Error Messages

La BASIC may generate the following error messages.

LABEL USED TWICE IN LINES: 11,12

LABEL TOO LONG

This error occurs when an attempt is made to define or call a label longer than 27 characters.

LABEL NOT FOUND

MISSING LABEL

This error occurs if a null string is specified as the label in the GOTO, GOSUB, or RESTORE statement.

OUT OF LABEL MEMORY

Label memory may be increased as described below.

Label Storage

By default, the labels are stored under Kernal ROM. To use some other memory area, use the following statements with appropriate line numbers at the beginning of the program (before the SYS 49152, 0 command).

5 POKE 49967,BO/256: POKE 49968,BO-INT(BO/256)*BO

10 TP=TP-32: POKE 49969,TP/256: POKE 49970,TP-INT(TP/256)*BO

In this case BO equals the bottom of the storage area, and TP equals the top of the storage area.

Each label requires 32 bytes of storage, so you can have 32 labels per 1K of memory. Thus, if the default memory area is used, up to 256 labels may be defined.

The advantage of storing labels in a separate area of memory is that La BASIC doesn't have to look through the entire BASIC program each time a label

is used. This can speed things up considerably. The speed gain will be especially significant in long programs that contain many subroutines and REM statements. As long as the REM statements are placed between two subroutines, they won't slow BASIC down and your programs will run faster.

Command Summary

SYS 49152, 0	Set up table of labels
SYS 49152, 1, <i>label</i>	GOTO <i>label</i>
SYS 49152, 2, <i>label</i>	GOSUB <i>label</i>
SYS 49152, 3 (<i>row, column, color</i>)	Clear screen, position cursor, set color
SYS 49152, 4 (<i>row, column, color</i>)	Position cursor, set color
SYS 49152, 5, <i>label</i>	RESTORE to line containing <i>label</i>

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C000:20 FD AE 20 9E B7 E0 01 7F
C008:F0 19 E0 02 F0 1E E0 03 49
C010:F0 14 E0 04 F0 13 E0 05 06
C018:F0 15 E0 00 F0 14 A2 0E 9E
C020:4C 8B E3 4C 60 C1 4C F3 82
C028:C1 4C F8 C1 4C D6 C1 4C 66
C030:4C C2 A5 2B 85 03 A5 2C 9F
C038:85 04 AD 2F C3 85 FD AD 04
C040:30 C3 85 FE A9 00 A0 01 FA
C048:91 FD A9 00 8D 35 C3 A0 B0
C050:00 B1 03 85 05 C8 B1 03 A8
C058:85 06 C8 B1 03 8D 33 C3 CA
C060:C8 B1 03 8D 34 C3 C8 B1 DF
C068:03 C9 8F F0 03 4C 4C C1 82
C070:C8 B1 03 C9 3D F0 03 4C BF
C078:4C C1 A2 00 A0 06 B1 03 68
C080:C9 00 F0 19 9D 0F C3 C8 10
C088:E8 E0 1C D0 F1 AE 33 C3 BB
C090:AD 34 C3 86 39 85 3A 4C 77
C098:98 C2 4C CC C0 A9 00 9D B7
C0A0:0F C3 20 8F C1 C0 00 F0 99
C0A8:34 A0 02 B1 FB 85 05 C8 90
C0B0:B1 FB 85 06 A9 37 85 01 51
C0B8:58 A9 F1 A0 C2 20 1E AB 97
C0C0:A6 05 A5 06 20 CD BD A9 49
C0C8:2C 20 D2 FF AE 33 C3 AD 3A
C0D0:34 C3 20 CD BD A9 8D 20 0E
C0D8:D2 FF 6C 02 03 AD 35 C3 6E
C0E0:F0 0A A9 DC A0 C2 20 1E CE
C0E8:AB 4C 65 A4 A0 00 38 A5 65
C0F0:03 E9 01 91 FD C8 A5 04 A4
C0F8:E9 00 91 FD C8 AD 33 C3 A8
C100:91 FD C8 AD 34 C3 91 FD 91
C108:C8 18 A5 03 69 02 85 03 3C
C110:A5 04 69 00 85 04 A2 00 16
C118:BD 0F C3 C9 00 F0 07 91 B6
C120:FD C8 E8 4C 18 C1 91 FD 9F

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C128:18 A5 FD 69 20 85 FD A5 30
C130:FE 69 00 85 FE A5 FE CD 40
C138:32 C3 F0 04 B0 09 90 0C FA
C140:A5 FD CD 31 C3 90 05 A9 F6
C148:01 8D 35 C3 A9 00 A0 01 22
C150:91 FD A5 05 85 03 A5 06 AA
C158:F0 05 85 04 4C 4F C0 60 08
C160:20 74 C2 20 8F C1 C0 01 71
C168:D0 1B A0 00 B1 FB 85 7A 32
C170:C8 B1 FB 85 7B C8 B1 FB FA
C178:85 39 C8 B1 FB 85 3A A9 55
C180:37 85 01 58 60 A9 AC A0 4A
C188:C2 20 1E AB 4C 65 A4 AD E2
C190:2F C3 85 FB AD 30 C3 85 48
C198:FC 78 A9 34 85 01 A0 01 A3
C1A0:B1 FB F0 2A A0 04 A2 00 17
C1A8:B1 FB F0 1A DD 0F C3 D0 47
C1B0:05 C8 E8 4C A8 C1 18 A5 EC
C1B8:FB 69 20 85 FB A5 FC 69 CA
C1C0:00 85 FC 4C 9E C1 BD 0F 90
C1C8:C3 D0 EB A0 01 60 A0 00 B4
C1D0:A9 37 85 01 58 60 A9 03 52
C1D8:20 FB A3 20 74 C2 A5 7B 57
C1E0:48 A5 7A 48 A5 3A 48 A5 12
C1E8:39 48 A9 8D 48 20 63 C1 74
C1F0:4C AE A7 A9 93 20 D2 FF 98
C1F8:A9 28 20 FF AE 20 9E B7 4A
C200:86 02 20 FD AE 20 9E B7 18
C208:8A A8 A6 02 E0 19 B0 37 F5
C210:C0 28 B0 33 18 20 F0 FF 6C
C218:A0 00 B1 7A C9 2C D0 0D 79
C220:20 FD AE 20 9E B7 E0 63 06
C228:B0 04 8E 86 02 60 38 8A CD
C230:E9 64 A0 00 8D 86 02 99 FB
C238:00 D8 99 00 D9 99 00 DA 37
C240:99 00 DB C8 D0 F1 60 A2 4C
C248:0E 4C 8B E3 20 74 C2 20 10
C250:8F C1 C0 01 F0 03 4C 85 E7
C258:C1 A0 00 B1 FB 85 41 C8 43
C260:B1 FB 85 42 C8 B1 FB 85 1D
C268:3F C8 B1 FB 85 40 A9 37 6D
C270:85 01 58 60 20 FD AE 20 80
C278:9E AD 20 A3 B6 AA F0 22 5B
C280:C9 1C B0 14 85 02 A0 00 BE
C288:B1 22 99 0F C3 C8 C4 02 60
C290:D0 F6 A9 00 99 0F C3 60 62
C298:A9 BD A0 C2 20 1E AB 4C BF
C2A0:65 A4 A9 CD A0 C2 20 1E 82
C2A8:AB 4C 65 A4 12 4C 41 42 94
C2B0:45 4C 20 4E 4F 54 20 46 27
C2B8:4F 55 4E 44 00 12 4C 41 6B
C2C0:42 45 4C 20 54 4F 4F 20 E2
C2C8:4C 4F 4E 47 00 12 4D 49 B2
C2D0:53 53 49 4E 47 20 4C 41 77
C2D8:42 45 4C 00 12 4F 55 54 27
C2E0:20 4F 46 20 4C 41 42 45 46
C2E8:4C 20 4D 45 4D 4F 52 59 40
C2F0:00 12 4C 41 42 45 4C 20 78
C2F8:55 53 45 44 20 54 57 49 35
C300:43 45 20 49 3A 20 4C 49 E7
C308:4E 45 53 20 3A 20 00 00 C6
C310:00 00 00 00 00 00 00 00 97
C318:00 00 00 00 00 00 00 00 9F
C320:00 00 00 00 00 00 00 00 A7
C328:00 00 00 00 00 00 00 00 AF
C330:E0 DF FF 00 00 00 00 20

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Farid Ahmad, the author of Sprint III (June 1992), lives in Islamabad, Pakistan.

SPEEDSPELL

By Daniel Lightner

SpeedSpell Utility Program (SUP) and SpeedSpell are a pair of programs for the 64 that can check SpeedScript documents for spelling errors. SUP is used to create and edit SpeedSpell dictionary disks, and SpeedSpell checks the spelling. If you already have COMPUTE's SpeedCheck, SpeedSpell can utilize your SpeedCheck dictionary. Both SUP and SpeedSpell are written in machine language. To enter them, you'll have to use MLX, our machine language entry program; see "Typing Aids" elsewhere in this section. When entering SUP with MLX, respond with the following values at the prompts.

Starting address: 0801

Ending address: 11C0

When entering SpeedSpell, respond with these MLX values.

Starting address: 0801

Ending address: 1518

Be sure to save copies of these programs after you've finished typing.

The Utility

Load and run SUP as you would any BASIC program. When the menu appears, choose option 1 to create a new dictionary disk. You'll have the option to format the disk. Before you answer the prompt, be sure that you place a new disk into drive 8. Never use a disk that contains any important files. Choose Y to format and N to abort. SUP prompts you to place the target disk in the disk drive and press the space bar to begin formatting.

SUP formats the disk and puts end-of-file markers on certain sectors. The program puts a unique ID of SS on its dictionary disks, so try to avoid using this ID on SpeedScript or SpeedSpell disks.

After a disk has been formatted, you won't need to use this option again with that disk. Using option 1 on a valid dictionary disk will destroy any information that it may contain.

SUP sets up 104 storage areas, with each area containing six blocks. Each letter of the alphabet has four ar-

reas assigned to it, and each area can hold up to 1535 characters and one end-of-file marker. Each of those four areas is designed to hold words whose second letter falls within a certain range of characters. For example, the first area assigned to the letter A would hold words that begin with A and whose second letter falls within the range A-H. The next area assigned to A would contain words whose second letters fall within the range I-N. The next area would be for letters O-T, and the last area would be for U-Z.

Following this group, the next four areas would be assigned to the letter B, then C, and so on. This system reserves space for 6140 characters for each letter. Words are stored in these areas back to back, minus the first character, with bit 7 of the last character set. By storing words in this fashion, SpeedSpell can check a text file much faster than the original SpeedCheck.

A newly created dictionary contains no words. It must be compiled by entering words one at a time, using option 2, or from SpeedSpell during an actual spell-checking session. With option 2, just type the word that you wish to enter and press Return. If the word already exists in the dictionary, it will be ignored.

Option 3 lets you delete any misspelled words that may be in your dictionary. Just follow the same steps used in option 2.

Option 4 lets you look at an area of words. Choose this option, and you'll be prompted for the first letter of the word. Next, you'll have to enter a number from 1 to 4, depending on the word's second letter. The ranges will be listed so you can easily decide which range is correct. When the listing starts, you can freeze it by holding down the space bar. It restarts when you release it.

If you have a SpeedCheck dictionary, use option 5 to add its words to the SpeedSpell dictionary. It's better to do this before you put any words in your SpeedSpell dictionary because SUP won't check for duplicate words while adding the SpeedCheck listing. You'll be prompted as to which disks to place into the drive.

Use option 6 when you wish to exit SUP.

SpeedSpell

Once you have a working dictionary, use SpeedSpell to check the spelling of your SpeedScript documents. Load and run SpeedSpell as you would a BASIC program. When the menu appears, choose the L option to load a SpeedScript document for checking.

After your file loads, SpeedSpell races through the document, setting flags to determine which words will be searched for in the dictionary. SpeedSpell uses a specially formatted dictionary disk so that it can rapidly find certain words. After SpeedSpell has set its flags, it'll prompt you to insert the dictionary disk in drive 8 and press the space bar. SpeedSpell checks for the SS ID to be sure that it's a dictionary disk. Be sure that the other disks you use have a different ID.

Next, SpeedSpell starts loading certain sectors from the disk and checking the document for the words found in those sectors. SpeedSpell only checks words more than four characters long. This process can take several minutes if the dictionary is large. The dictionary can store 24 disk blocks of words for each letter of the alphabet. After the document has been checked, you can start editing words. Use the G option to get the first misspelled word. If no words are found, SpeedSpell responds with an *End of file!* bar and the Inst/Del key to correct the spelling. This is a good time to have a paper dictionary handy. Press Return to place the corrected word in the document.

If a word is correct but not in your dictionary or if the word has been edited, you can add the word to the dictionary by selecting the P option. SpeedSpell checks the dictionary automatically for the word before it enters it. It will not save duplicate words.

Function key f7 can be used to recall the last misspelled word. It will recall the word even if it has been edited and entered into the dictionary.

Finally, when the last word has been fixed, select the S option to save the file to disk. Remember to swap disks. SpeedSpell looks at the ID to be sure that you've removed the dictionary disk.

SpeedSpell marks the misspellings by adding a value of 128 to each character. If you use SpeedScript stage 1

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or stage 2 commands, try not to put them in bunches of more than four. SpeedSpell will mistake them for misspelled words and subtract a value of 128 from them, leaving them as useless letters in the document.

Choose Q to quit SpeedSpell. Be sure to make backup copies of all your important SpeedScript disks, SpeedSpell, SUP, and especially your dictionary.

SUP

```
0801:0B 08 70 17 9E 32 34 30 6E
0809:37 00 00 00 20 20 20 96
0811:20 20 20 20 20 A0 C4 B9 06
0819:3C 08 99 F8 00 B9 FD 08 F6
0821:99 33 03 88 D0 F1 A0 09 4C
0829:B9 0C 08 99 FF 03 88 D0 A1
0831:F7 A9 D7 85 2D A9 13 85 B6
0839:2E 4C 00 01 0A 60 02 D7 31
0841:13 37 10 B9 6E 09 99 E8 F9
0849:07 C8 D0 F7 EE 02 01 EE 19
0851:05 01 C6 F9 D0 ED A2 03 23
0859:20 34 03 F0 33 C9 07 D0 95
0861:16 A2 01 20 34 03 D0 0A A0
0869:A2 04 20 34 03 18 69 07 65
0871:10 05 A2 0A 20 34 03 85 1D
0879:A8 A5 A7 85 A9 A5 FE 85 FB
0881:F7 A5 FF 85 F8 20 6C 03 73
0889:A5 F8 85 FF A5 F7 85 FE 72
0891:E8 20 34 03 D0 1E A2 08 21
0899:20 34 03 A0 02 84 A8 85 2A
08A1:A6 18 A5 FC 65 A6 85 F7 58
08A9:A5 FD 65 A7 85 F8 20 6C EF
08B1:03 4C 13 01 E8 20 34 03 FB
08B9:D0 1C A0 03 84 A8 E8 20 36
08C1:34 03 F0 08 A2 08 20 34 F4
08C9:03 4C 5C 01 A2 0F 20 34 CF
08D1:03 E6 A7 4C 5C 01 E8 20 AF
08D9:34 03 D0 0A E8 20 34 03 B2
08E1:18 69 04 A8 D0 D6 E8 20 37
08E9:34 03 D0 0A A2 02 20 34 21
08F1:03 18 69 06 D0 ED A2 08 A2
08F9:20 34 03 D0 E6 A9 00 85 F7
0901:A7 A4 FB 0C 06 FA 2A 37
0909:26 A7 C6 FB CA D0 F2 A8 D8
0911:60 48 B1 FE 85 FA A9 08 FE
0919:85 FB 68 A4 FE D0 D2 C6 4A
0921:FF C6 FE C0 E7 D0 DE A4 B5
0929:FF C0 E7 D0 D8 A9 37 85 BA
0931:01 58 4C D0 08 A4 A8 F0 49
0939:22 A5 F7 38 E5 A8 B0 03 7E
0941:C6 F8 38 85 F7 A5 FC E5 8A
0949:A8 B0 02 C6 FD 85 FC B1 3A
0951:F7 88 91 FC 98 D0 FD C4 42
0959:A9 F0 0A B1 F7 C6 FD C6 76
0961:F8 C6 A9 10 EC 60 78 E6 98
0969:01 4C 16 08 60 00 B0 08 73
0971:C8 07 9E 32 30 36 31 E3 41
0979:92 09 A9 20 8D B2 92 C1 6C
0981:8D 18 D9 08 EF 8D 28 03 25
0989:70 AB 20 11 21 D0 20 C7 28
0991:02 20 FA 25 4D D0 20 CC 0A
0999:80 1F 00 A9 45 AA 38 11 A4
09A1:85 FC C0 59 03 00 F0 A8 06
09A9:54 B8 1E C0 3A D3 01 5F 66
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09B1:31 F0 17 C9 32 F0 24 C9 7F
09B9:33 15 67 34 F0 27 C9 35 C7
09C1:F0 2E C9 36 F0 35 4C 49 B2
09C9:AE B9 9C B7 B8 80 42 C1 BE
09D1:06 0A 77 98 81 42 99 09 33
09D9:A5 70 AA 0C 97 42 A9 02 0C
09E1:8D BF 09 AE 0E 4C 2D 85 38
09E9:59 E2 FC 34 4A DB BC 0C 8B
09F1:E0 88 0F 60 34 0C 4E F0 DD
09F9:67 C9 59 58 EB 9E 66 05 8E
0A01:80 A9 13 A2 73 D9 44 80 58
0A09:0F A7 89 40 1C BA C8 71 92
0A11:01 A9 0F 2B 56 40 94 00 81
0A19:5A 0C B0 9C 8A F3 00 86 E7
0A21:7A 86 2B 80 88 05 60 30 CA
0A29:02 10 0B F6 08 4C E7 20 74
0A31:9B 03 18 56 30 13 A0 14 5F
0A39:67 26 00 47 DC 00 EC C7 87
0A41:25 60 E2 21 F0 15 A7 12 AB
0A49:A0 F0 40 00 95 80 0A 09 BD
0A51:68 68 9C 73 00 22 AB 0A FE
0A59:D1 F2 E1 66 D3 72 07 88 B4
0A61:80 98 03 68 EC 43 1D 80 F1
0A69:F0 03 D8 E1 08 E0 F0 5F F4
0A71:71 04 B0 60 20 66 0D 78 88
0A79:4A 0D C9 05 90 B8 4D A7 29
0A81:09 60 AC 35 03 B9 9E 12 69
0A89:A8 AD E4 68 C9 09 90 B0 1F
0A91:48 0F 90 06 C8 C9 15 90 28
0A99:01 C8 8C 60 FC B7 C3 A3 E9
0AA1:A5 E0 9D C3 8F 80 00 D0 FF
0AA9:03 20 89 0E 2D 9B 01 C3 F6
0AB1:3B 2A 02 50 9B E1 EC 33 A4
0AB9:0A 20 FE 8A A0 02 F0 42 94
0AC1:CE 4C 0F 30 13 10 27 A2 FE
0AC9:A2 1E 80 36 DD CB F0 18 42
0AD1:8A DC 03 1A 76 B0 E8 EC 99
0AD9:40 4D E6 4D 41 C1 1E C0 21
0AE1:0A 0A EE 13 AD C3 20 7C C5
0AE9:48 81 0F 02 1C 0A C5 10 29
0AF1:01 60 4C B3 E7 EE 80 AD 0D
0AF9:BF EA 01 F0 F4 37 32 C9 8A
0B01:C5 72 6E 0A D0 E8 28 2F AE
0B09:38 24 AA C5 FB 82 13 49 4F
0B11:0A B9 36 03 B0 09 C8 CC 99
0B19:14 04 A0 50 45 20 BE FC 74
0B21:0A AC C0 B0 B9 12 80 EC 8E
0B29:06 21 38 76 03 0C B4 FD A8
0B31:06 B5 20 5A 5A 3F 90 02 C4
0B39:D4 0A 20 72 09 20 2D E0 6B
0B41:28 2C 0B E6 06 01 1A 06 B4
0B49:D0 E9 4C D8 38 A5 FB ED 97
0B51:34 03 CE 6A 00 FC E9 4A D4
0B59:0D A0 01 40 5D 80 F7 80 9F
0B61:C0 B2 10 B7 81 C3 0A 5C 8D
0B69:C4 03 02 01 40 02 18 C5 F2
0B71:45 18 80 C2 E3 C9 4A C2 0A
0B79:00 E9 0A 76 FD 0D FB A9 78
0B81:C0 B8 0E 00 31 06 F0 F0 5C
0B89:58 19 03 C0 07 03 C4 0B 57
0B91:20 AE 58 42 81 E7 40 F9 B8
0B99:A2 EB C6 45 64 21 02 2E 03
0BA1:40 CD 41 B2 F0 0F 18 2D BF
0BA9:A2 D0 EC 90 04 F0 03 20 F5
0BB1:F6 B0 4D 86 D6 02 19 5E 67
0BB9:05 84 D0 08 A9 AA 01 03 CC
0BC1:30 10 18 1A 28 01 F1 4C 0E
0BC9:3E 47 ED F0 B4 2F FF 96 96
0BD1:F1 58 6C 78 40 42 71 02 FB
0BD9:0C C9 30 D0 09 4C BB 15 81
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0BE1:C5 8D E1 01 A9 81 A5 FF 29
0BE9:99 88 71 C0 47 AB 3C 0C 96
0BF1:81 0C 34 05 D0 A9 1D 7A 84
0BF9:03 60 2C 01 B9 E0 B0 3A 2C
0C01:60 BF C9 0D DA 4D 0D A2 0C
0C09:FA 9A 4C 0D 08 AE AF 78 72
0C11:0C 68 9C 78 24 04 88 07 AD
0C19:AE C6 02 A9 C4 1D 92 0B DF
0C21:48 FB 14 4B 48 CC B0 02 6C
0C29:EC AC 00 AD C5 54 14 C9 2F
0C31:12 90 0E A0 12 C9 19 90 BC
0C39:08 A0 11 C9 1F 90 02 A0 1C
0C41:10 8C C4 02 84 F7 8D 8D E9
0C49:06 D8 C8 68 80 0D 68 FD 41
0C51:90 89 FD A5 FE EE A0 FE 22
0C59:60 18 A5 FB 69 00 85 FB 6E
0C61:A5 FC 69 01 85 FC E8 4D 08
0C69:01 20 CF FF 91 72 37 0D D5
0C71:47 00 D0 F2 C6 0E 05 1A 09
0C79:8C 02 A9 05 85 FD 4C 4B E5
0C81:0C 20 08 0E 8E A3 29 EF CE
0C89:54 28 25 6D 3E 28 19 1E 34
0C91:56 02 AD 1D 02 09 19 11 54
0C99:D0 A9 08 20 B1 E3 49 6F A6
0CA1:85 B9 20 93 7D C8 70 89 A1
0CA9:A8 91 87 03 66 20 AE C0 6D
0CB1:3C B9 FC 0F 75 21 0F 3B 70
0CB9:21 15 41 3E 21 C5 35 84 C2
0CC1:14 1C 01 8C 16 00 0A D3 6C
0CC9:02 80 3B 87 17 00 47 6A 94
0CD1:31 90 F5 C9 35 B0 F1 06 58
0CD9:C7 31 11 80 00 85 47 CC BD
0CE1:86 43 40 4B 1E 6F 00 F1 6B
0CE9:10 C7 48 80 B0 10 57 9B 1D
0CF1:31 0A 0B 19 F5 00 0D 7D 7F
0CF9:D4 82 37 C3 01 F6 11 0C 52
0D01:AA 6D 80 18 0E 47 20 5F 8A
0D09:F5 FA 0C 46 E4 00 03 39 29
0D11:FF D0 FB E8 E0 50 D0 F4 4C
0D19:C2 31 8A 59 00 3E 0D EE C9
0D21:9E AD C6 02 C9 32 D0 F3 9B
0D29:A5 CB 00 71 1A D0 FA 0A 34
0D31:85 D3 A9 17 85 D6 20 6C DD
0D39:E5 AD F8 8C 83 A8 B9 89 55
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0D69:AA 0A 80 01 93 00 F0 CE C8
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SPEEDSPELL

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 0839:2E 4C 00 01 0E 60 05 78 F7
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 0849:07 C8 D0 F7 EE 02 01 EE 19
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 0859:20 34 03 F0 33 C9 07 D0 95
 0861:16 A2 01 20 34 03 00 0A A0
 0869:A2 04 20 34 03 18 69 07 65
 0871:10 05 A2 0A 20 34 03 85 1D
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 08A9:A5 FD 65 A7 85 F8 20 6C EF
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 0A81:30 F4 01 18 B7 06 AC 35 F0
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PROGRAMS

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1129:1C 42 4C 7F 12 A2 00 77 FD
1131:A7 38 E9 40 9D 35 03 E8 27
1139:8E E4 70 0A 00 EC F3 01 27
1141:4F 80 19 DB 28 13 EE 48 BF
1149:DE 36 86 0B 8D 61 D6 A3 2D
1151:90 03 4C A9 12 A8 B6 C9 0B
1159:05 90 B9 C9 1E B0 B5 0D 22

```



```

1161:0F 81 20 40 05 3B 58 69 A2
1169:10 92 69 1D 92 0D 07 00 0E
1171:07 CE 05 38 00 F0 18 2D 10
1179:70 2C 3E 8D 84 60 38 8D 23
1181:16 E9 01 28 03 28 E9 00 58
1189:09 03 14 60 AD D6 4D 09 E5
1191:40 F8 05 08 BC C0 C4 D2 78
1199:0B 43 D3 0E 43 AD D4 5C 44
11A1:04 30 AD D5 66 31 20 4A 67
11A9:13 4C 37 11 0F 3C 07 62 3A
11B1:00 01 90 10 C9 24 0C C9 E7
11B9:27 F0 09 C9 1B 90 05 C9 58
11C1:41 B0 01 60 18 69 80 91 CF
11C9:30 C8 4C 4C 13 AD CE A1 13
11D1:0C DE A0 D0 AD AD D1 34 CE
11D9:C8 07 AD CF 83 CB 9F 20 7F
11E1:A9 0C B4 90 14 AA 52 8A F5
11E9:4F 09 D0 F5 AD BC 8D 91 7C
11F1:04 A9 01 8D C1 8C AE 6E 85
11F9:4A E0 AE CA E0 00 D0 F8 9D
1201:A5 30 85 FD A5 31 85 FE 90
1209:A9 9A E8 0C C5 9D A2 07 77
1211:B1 71 A9 1D 20 D2 FF E8 A6
1219:EC 16 5C D0 ED AC C1 10 87
1221:20 EF 0C EC 29 F0 04 90 47
1229:5B B0 1A EE 0C B9 35 03 0E
1231:91 34 DA 68 CC F2 AD FA 95
1239:C9 01 F0 77 43 CD 02 A5 13
1241:FD 8F 7E A5 FE 08 C8 48 64
1249:80 88 04 A8 CA 01 CD 6A 3B
1251:56 D0 F0 E8 CD 47 52 D0 82
1259:E9 20 F8 D0 07 AC CE C4 F3
1261:A7 C2 B1 FD 99 87 04 C8 DB
1269:C0 18 D0 F6 4C DB 13 A0 16
1271:01 AD BD AB 13 FB AD BE 96
1279:02 85 FC 88 B1 FB C8 91 C8
1281:FB 20 D8 0B A5 FB C5 FD 1E
1289:D0 F1 A5 FC C5 FE D0 EB CE
1291:20 E6 0B F0 E0 57 32 04 BC
1299:AD CA 02 CD 50 A2 D0 4C 5F
12A1:27 14 A9 00 8D D0 02 E2 2A
12A9:0A 20 11 13 C8 CC 6A D0 4D
12B1:F7 A0 00 8C A0 0B B1 30 87
12B9:C9 20 F0 09 20 EC 12 EE 41
12C1:34 03 4C 7E 14 4C 5F 12 D4
12C9:20 65 DA 8D 01 20 3E 93 24
12D1:96 E0 44 20 4F 46 20 46 1E
12D9:81 0B 20 21 66 BA 6E 00 92
12E1:C1 4D 24 9A 3F 20 23 36 5F
12E9:31 31 38 97 03 58 C4 31 A7
12F1:36 32 55 31 6B B0 55 13 57
12F9:00 07 20 42 20 50 20 ED E0
1301:30 B6 08 2D 55 49 2B 9A 81
1309:A8 0F 80 50 C9 F0 50 00 F0
1311:59 00 1D 22 49 53 4B 20 F7
1319:1C 68 BC 0B 20 12 41 43 BE
1321:45 96 93 14 A4 73 99 AC 16
1329:F0 9A 62 59 20 64 41 4E B3
1331:49 E1 87 50 03 0E 4E 39 90
1339:43 00 B1 50 59 52 07 93 F1
1341:51 B7 F1 63 D1 D4 CD 70 60
1349:53 77 E1 20 69 4E 54 99 FB
1351:6C 54 40 15 10 61 2C 48 C2
1359:72 49 47 48 54 ED 72 45 FC
1361:53 45 52 56 33 CF 0D 0D 32
1369:93 9A 60 D5 94 91 1E D7 68
1371:E0 86 31 39 39 32 27 5F A3
1379:C3 4F 4D 50 55 54 ED D0 AC
1381:55 42 4C 8B E0 41 F2 B6 CD
1389:0D 9A 91 E7 03 00 F5 2D BE

```

```

1391:0D 1C 13 20 20 A8 AC 2F D5
1399:3C 12 CF 9A 14 78 2B 8C 6B
13A1:40 CD 42 4E 55 E4 A4 C2 D2
13A9:CC E7 24 CC 4F 41 2F 09 68
13B1:4E E3 43 52 49 50 F4 C4 BF
13B9:4F 43 55 4D 45 4E 54 12 F5
13C1:CE 51 E1 D3 C3 91 D3 41 6A
13C9:56 27 06 17 C6 49 4C 45 50
13D1:9B 25 15 D0 3E 25 19 2A A1
13D9:20 C9 4E 20 C4 49 43 54 74
13E1:49 4F 4E 41 52 59 F7 73 B9
13E9:8E 0A C5 1F 9E 44 1D 9E 63
13F1:62 49 53 83 3E 3E C7 7C 35
13F9:3E C7 45 B2 10 D4 48 45 AE
1401:20 CE 45 58 80 5F D7 88 D4
1409:18 80 0D 11 12 28 CE 1D FB
1411:96 D1 BB 74 2D 20 C5 58 85
1419:49 54 20 D3 E1 04 45 44 2A
1421:53 50 45 4C 4C 0D 9A C4 05
1429:4D 0B 94 27 2D 0D 2F 89 45
1431:13 8F 84 0A 0F 82 8D 00 95
1439:2D 2D 2D 9B 00 04 08 0C CE
1441:10 14 18 1C 20 24 28 2C 49
1449:30 34 38 3C 40 44 48 4C 51
1451:50 54 58 5C 60 64 30 83 EF
1459:0F 01 01 02 02 02 D0 00 43
1461:03 03 04 04 04 0D 05 05 EF
1469:06 06 06 06 00 07 07 08 16
1471:08 08 0D 09 09 0A 0A 0A 60
1479:D0 00 0B 0B 0C 0C 0C 0D D1
1481:0D 0D 0E 0E 0E D0 00 F0 D8
1489:0F 10 10 10 10 11 11 12 21
1491:12 12 13 13 13 14 14 14 FF
1499:15 15 15 70 1E 16 16 17 C7
14A1:17 17 18 18 18 19 19 19 10
14A9:1A 1A 1A 1B 1B 1B 1C 1C F3
14B1:1C 1D 1D 1D 1E 1E 1F 69
14B9:1F 1F 20 C0 83 DF C8 F1 68
14C1:68 E8 F0 30 98 C3 20 23 B0
14C9:A1 78 C8 90 88 02 08 0E 6D
14D1:01 07 0D 00 06 0C 12 05 67
14D9:0B 11 04 0A 10 A7 23 DC 2F
14E1:51 10 87 40 03 33 04 77 10
14E9:4F 52 44 3F 20 41 42 43 98
14F1:44 45 46 47 48 49 4A 4B 12
14F9:4C 4D 4E 4F 50 51 52 53 1A
1501:54 55 56 57 58 59 5A 01 C8
1509:42 84 17 09 0F 15 1B 28 14
1511:03 00 00 EA 00 00 00 00 6B

```

Daniel Lightner is a frequent contributor who seldom misspells words now.

DYNAMIC MEMORY

By Frank Gordon

It's possible to watch the 64 in action by redirecting the interrupt vector at 788 and 789 to a routine that prints selected areas of memory to the screen. Dynamic Memory is such a program, and it does it 60 times per second.

Dynamic Memory displays selected areas of memory at the top of the screen in a nine-line display. Line 1 displays the BASIC pointers from 43 to 56. Lines 2 and 3 display the top 80 bytes of the stack.

Lines 4 and 5 display the 80 bytes of the input buffer, and lines 6-9 display the first 160 bytes of BASIC memory.

By examining these, you can see how BASIC pointers change, how the stack operates when you list and run a program, and how line numbers are stored in the stack's last two bytes. You can also see how the input buffer shortens programs by tokenizing keywords and how the screen editor inserts and deletes lines in memory.

Typing It In

Dynamic Memory is written entirely in BASIC. To help avoid typing errors, use The Automatic Proofreader; see "Typing Aids" elsewhere in this section. Be sure to save a copy of the program when you've finished typing it in.

Using Dynamic Memory

Load and run Dynamic Memory as you would any BASIC program, but then enter `SYS 900` to activate the screen. Press `Ctrl/Home` and cursor down below the memory display. To deactivate, press `Run/Stop-Restore`.

Screen Codes

The display may appear strange because it consists primarily of screen codes. Text may be easier to comprehend if you switch to upper- and lowercase mode by simultaneously pressing the Commodore key and the Shift key.

On the first line, in the upper left corner, you'll see a line that begins with the letters `ah`. These letters represent the values of memory locations 43 and 44, the BASIC program pointer. Screen codes `a` and `h` equal 1 and 8 in low-byte/high-byte format.

If you place your cursor on a line of code and press Return, the line will appear in the input buffer, which is line 4 on the screen. The original code will appear shortened because it has been tokenized. For example, list line 135 on a clear part of the screen. It should appear as the following.

```
135 FOR J = 900 TO 969: READK: POKEJ,K: NEXT
```

Now place your cursor on this line and press Return. The line will appear in the buffer (line 4) as follows.

PROGRAMS

**AJ2900S969:K:WJ,K:HD@D@POKEJ.K:
NEXT@@@**

The line number 135 is stored in the last two bytes of the stack as @. All 64 tokens are equal to 128 or greater. In the line above, the BASIC keywords are represented as follows.

Token	Value	Screen code
FOR	129	a
=	178	2
TO	164	\$
READ	135	g
POKE	151	w
NEXT	130	b

Modifying Dynamic Memory

You may wish to modify Dynamic Memory to examine other pointers and memory areas. If so, load the program and enter the following changes.

```
25 REM INDEX INTO BUFFER
30 DATA 165,11,141,0,4
35 REM LINE NUMBER & ADDRESS
40 DATA 162,5,181,57,157,2,4
50 DATA 202,16,248
60 REM STACK POINTER
65 DATA 186,142,9,4
135 FOR J=900 TO 978: READK: POKEJ,K:
NEXT
```

AT
rh
hb
FQ
MK
HJ

Now when you run the program, the first line shows the values for the input buffer index (11,\$b), the current and previous line numbers and the address of the current BASIC statement (57-62, \$39-\$3E), and the value of the stack pointer. Many variations are possible with this display.

You can see a listing of screen codes in a number of Commodore publications, including *Mapping the Commodore 64 and 64C* (Appendix G) by Sheldon Leemon from COMPUTE Books. You can also see them by running the following short program.

```
5 REM PRINT SCREEN CODES
10 FOR X=0TO255
20 POKE 1024+X,X: NEXT
30 PRINT"{'3 DOWN)"
```

DYNAMIC MEMORY

MM 5 REM COPYRIGHT 1992 - COMP
UTE PUBLICATIONS INTL LTD
- ALL RIGHTS RESERVED
QS 10 REM - REDIRECT INTERRUPT
G-36 COMPUTE OCTOBER 1992

```
VECTOR TO INSERTED PROGRAM
AH 15 DATA 120,169,145,141,20,
3,169,3
RX 20 DATA 141,21,3,88,96
HM 25 REM SHOW BASIC POINTERS
{SPACE}43-56 ON 1ST LINE
OF SCREEN
QG 30 DATA 162,13,181,43
EP 40 DATA 157,0,4,202,16,248
SH 70 REM SHOW LAST 80 STACK B
YTES ON 2ND & 3RD SCREEN
LINES
EF 75 DATA 162,79,189,176,1,15
7,40,4
MM 80 DATA 202,208,247
XK 85 REM SHOW INPUT BUFFER ON
4TH & 5TH LINE OF SCREE
N
FB 90 DATA 162,79,189,0,2,157,
120,4
HH 95 DATA 202,16,247
CF 100 REM SHOW 1ST 160 BASIC
{SPACE}PROGRAM BYTES ON
LINES 6,7,8 & 9 OF SCR
EEN
MP 105 DATA 162,55,189,1,8,157
,200,4
EC 110 DATA 202,16,247
PS 115 DATA 162,103,189,57,8,1
57,0,5
AD 120 DATA 202,16,247
XA 125 REM BACK TO REGULAR INT
ERRUPT ROUTINE
RC 130 DATA 76,49,234
XH 135 FORJ=900TO969:READK:POK
EJ,K:NEXT
```

Frank Gordon is the author of *Graphos* (April 1992). He lives in Orono, Maine.

SCAN 64

By Daniel Lightner

Here's a short utility program that lets you view the entire contents of your 64's memory. It's similar to Dynamic Memory, also published in this section, but it doesn't respond to immediate input.

Entering the Program

Scan 64 is written entirely in machine language. To enter it, use MLX, our machine language entry program; see "Typing Aids" elsewhere in this section. When MLX responds, reply with the following.

Starting address: C000
Ending address: COEF

When you've finished typing in Scan 64, be sure to save a copy to disk be-

fore exiting MLX.

Using the Program

Scan 64 is easy to use. Load it with the ,8,1 extension, type *NEW*, and then press Return. To activate the program, enter *SYS 49152*. At the top of the screen, Scan 64 displays the range of addresses being displayed, followed by the contents of the first 512 bytes of memory. (Note the *ah* in bytes 43 and 44, as mentioned in connection with Dynamic Memory.)

To scan forward in memory, press the right cursor key. To scan backward, hold down the Shift key while pressing the same cursor key. To exit the program, press Return.

You can see the contents of Scan 64 itself, by scanning locations 49152-49663. You can easily spot the words *MEMORY LOCATIONS* on lines 7 and 8. If you can't, press the Commodore key and the Shift key simultaneously to enter upper- and lowercase mode. If you load other programs before you load Scan 64, you can also see their contents, depending on their starting addresses in memory.

SCAN 64

```
C000:A9 00 85 FB 85 FC A0 00 28
C008:A9 9A 20 D2 FF A9 93 20 24
C010:D2 FF B9 D7 C0 20 D2 FF DB
C018:C8 C0 12 D0 F5 A5 FC A6 64
C020:FB 20 CD BD A9 20 20 D2 1E
C028:FF A9 2D 20 D2 FF A9 20 C5
C030:20 D2 FF 18 A5 FB 69 FF E7
C038:AA A5 FC 69 01 20 CD BD 90
C040:A2 02 20 AF C0 20 C9 C0 6D
C048:18 A5 FD 69 20 85 FD A5 4E
C050:FE 69 00 85 FE 20 BA C0 B2
C058:E0 10 D0 E9 A5 FB 48 A5 5A
C060:FC 48 A2 00 20 AF C0 A9 B1
C068:7C 85 FD A9 04 85 FE 20 38
C070:C9 C0 20 BA C0 18 A5 FD 66
C078:69 28 85 FD A5 FE 69 00 45
C080:85 FE E0 10 D0 E9 68 85 26
C088:FC 68 85 FB 20 E4 FF C9 71
C090:1D F0 09 C9 9D F0 08 C9 25
C098:0D D0 F1 60 4C 06 C0 38 4D
C0A0:A5 FB E9 00 85 FB A5 FC 95
C0A8:E9 04 85 FC 4C 06 C0 A9 46
C0B0:D0 95 FB A9 C7 95 FC A2 4B
C0B8:00 60 18 A5 FB 69 20 85 FA
C0C0:FB A5 FC 69 00 85 FC E8 D8
C0C8:60 A0 00 B1 FB 91 FD C8 A8
C0D0:C0 20 D0 F7 A0 00 60 20 3A
C0D8:4D 45 4D 4F 52 59 20 4C 75
C0E0:4F 43 41 54 49 4F 4E 53 BF
C0E8:20 00 00 00 00 00 00 7A
```

Daniel Lightner is a frequent contributor who lives in Sidney, Montana.

MINDBOGGLE

By John Cameron

If you want a challenging yet entertaining game that will help you whittle away a few hours, look no further. Mindboggle is just what you've been looking for.

Mindboggle (not to be confused with Mind Boggle, May 1984) is a strategy game for up to four players. Your memory will be pushed to the limit as you search through a game board of almost 200 blocks to locate identical pairs hidden within. As if this wouldn't be hard enough, you must also contend with three other human or computer players, who'll do everything in their power to lower your score while searching for the matches themselves. Special blocks placed randomly throughout the board may be either helpful or harmful to you. If used to your advantage, they may mean the difference between the joy of victory and the agony of defeat.

Getting Started

Mindboggle consists of two programs. The first is written in BASIC. To avoid typing errors, enter it using The Automatic Proofreader; see "Typing Aids" elsewhere in this section. When you've finished typing, be sure to save a copy of the program before exiting Proofreader. The second program is written in machine language and must be typed in using MLX, our machine language entry program; see "Typing Aids" again. Enter the following values when MLX prompts.

Starting address: C800

Ending address: CB77

When you've finished typing, save the program to the same disk as the BASIC portion of the game. Save it with the filename BOGGLE.ML before exiting MLX.

Game Options

Load and run the BASIC portion of the game. It automatically loads the machine language routines. Since Mindboggle is a multiplayer game, it plays with one joystick plugged into either port or two joysticks. When the title screen appears, you'll be asked for the number of players. Move either joystick to alter the value, and then press the

fire button. The initial number of players is zero. If this value is selected, all four player positions will be controlled by the computer.

If human players are competing, the game will ask them to type in their names. The final question asked is the skill level. There are eight levels available, ranging from Simple to Difficult. In the easier levels, fewer pairs have to be found, and a larger number of special blocks are scattered throughout the game board. In the difficult levels, the board consists almost entirely of pairs, with only a few special blocks.

Once these options are entered, the game pauses momentarily to randomly place the matching blocks. The length of this pause depends on the skill level chosen. Higher levels require more time to position the increased number of pairs.

Playing the Game

When the game begins, you are presented with a view of 171 blocks, turned so that only their backs are showing. The players' names are arranged below them, with the current player's name highlighted in white. Scores are shown under the names, and the number of pairs remaining to be found is printed at the bottom of the screen. A cursor in the shape of an open rectangle appears at the top of the screen. Its color corresponds to the color in which the current player's score is displayed. This helps in determining whose turn it is.

Move this cursor to a block that you wish to open. Press the fire button to reveal one of five possible designs. When a block is uncovered, the player must then find its twin, located somewhere else on the board. If the second block doesn't match the first, then both are turned back over. If the two match, that player earns 100 points, and both blocks are covered by a marker in that player's color. Among the special blocks found in the game is one that looks like a closed hand. If it's encountered before or after uncovering a patterned block, then all blocks which match that pattern are revealed. This can be advantageous when a pattern has more than one twin, thus earning the player a greater number of points in a single move.

If one player uncovers several hand blocks in a row, play continues until that player locates a different block design. If any succession of hands ends with a happy face block or if this block is revealed upon a player's first move, then that player is awarded 250 bonus points instantly. Stop blocks are rare, and they resemble a stop sign with a diagonal line crossed through it. Come across one of these at any time, and you lose your turn.

Perhaps the most interesting block is the masked thief block. This gray block lets you steal 50 points from any opponent by changing the opponent's colored marker to your own color. If no opponent markers are available, then select a closed block as the target instead. Should a closed block be revealed instead, it will remain open if it's not a pattern block. The game continues until every pair is revealed. This doesn't necessarily mean that every block is opened. There may be some special blocks hidden even after the last set of twins has been located. At this point, the game goes to a special wrap-up screen, where the final scores and statistics are displayed. The winner is the individual with the highest score. If two players have the same score, the winner is the one with the greater number of markers. So try to keep as many blocks as you can. With the game over, hit the fire button to play again. You will be returned to the title screen and given the option to keep the same players for a second game or to change them. Likewise, the skill level may then be altered for a more or less challenging game, depending on your preferences.

Computer Opponents

One of the most attractive features of Mindboggle is the ability to pit your wits against the computer. Though it may sometimes seem like the machine has the advantage, it actually tackles the game much in the same manner that we do. It uses a probability function to calculate its chances of finding a hidden pattern and its match. Like a human being, it's more apt to locate a block that has been revealed several times when there are few blocks remaining. Its memory capability increases, however, at higher skill levels.

PROGRAMS

Game Tips

In the higher levels, where special blocks are less frequent, greater emphasis should be placed on memorizing the locations of patterns, especially those that have been revealed numerous times. If you find it necessary to use a pad and pencil to jot down notes, write quickly, for nonmatching patterns don't stay open long.

In the lower levels, the strategy is different. It's often better to search for happy faces than the patterns themselves. Not only do you earn a higher score with them, but you also are protected from having your points stolen. When going against a computer opponent, it's safest to have markers around the middle of the board, rather than the sides. So if you steal a marker, concentrate in the center, as the computer will be less likely to change it back.

MINDBOGGLE

```
AP 0 REM COPYRIGHT 1992 - COMP
    UTE PUBLICATIONS INTL LTD
    - ALL RIGHTS RESERVED
KF 1 IFA=0THENPOKE53265,11:A=1
    :LOAD"BOGGLE.ML",8,1
KM 2 POKE56578,63:POKE56576,19
    6:POKE53272,18:POKE648,19
    6:GOSUB96:POKE788,52
RA 3 PRINT"CLR"CHR$(14)CHR$(
    8):POKE53280,0:POKE53281,
    0:GOSUB112
PF 4 IFHS>FHTHENFH=HS
JD 5 PRINT"HOME"TAB(11)
    "{CYN}HIGH SCORE: {WHT}"
    :AS=STR$(FH):Z=7:GOSUB20
    4:PRINTCS
GJ 6 PRINTTAB(14)"{3 DOWN}
    {BLU}STUVWXYZ+-~":PRIN
    TTAB(14)"{3 DOWN}{SHIF-SPACE}
    {K}{I}{T}{@}{G}{+}{M}{E}
    {Z}{S}"
FQ 7 PRINTTAB(12)"{3 DOWN}
    {GRN}COPYRIGHT @ 1992":PR
    INTTAB(12)"{DOWN}{YEL}COM
    PUTE MAGAZINE"
HD 8 PRINTTAB(8)"{3 DOWN}{RED}
    WRITTEN BY{2 SPACES}JOHN
    {SPACE}CAMERON{4 DOWN}":P
    OKE53265,27
FD 9 IFPH=0THEN16
HF 10 GOSUB205:AS(0)="YES":AS(
    1)="NO":YN=0
XX 11 PRINTLEFT$(DW$,22)TAB(8)
    "{WHT}USE THE SAME PLAYE
    RS: {CYN}"AS(YN)
MC 12 GOSUB82:A=YN-(JR=8ANDYN<
    1)+(JL=4ANDYN>0):IFFB=0T
    HENYN=A:GOTO15
SR 13 IFA=YNTHE12
PP 14 YN=A:GOTO11
```

```
EB 15 IFYN=0THEN32
GM 16 GOSUB205:PL=0
HQ 17 PRINTLEFT$(DW$,22)TAB(10)
    "{WHT}NUMBER OF PLAYERS
    : {CYN}";PL
KF 18 GOSUB82:P=PL-(JR=8ANDPL<
    4)+(JL=4ANDPL>0):IFFB=0T
    HENPL=P:GOTO21
PD 19 IFP=PLTHEN18
JC 20 PL=P:GOTO17
XQ 21 IFPL=0THEN32
AR 22 FORK=1TOPL:GOSUB205:IN$=
    "":CT=0
DS 23 PRINTLEFT$(DW$,22)TAB(4)
    "{WHT}ENTER NAME OF PLAY
    ER"K"{LEFT}: ";GOSUB25
HD 24 PL$(K)=LEFT$(IN$+"
    {7 SPACES}",8):NEXT:GOTO
    32
BQ 25 PRINT" {CYN}*";
CG 26 GETAS:IFAS=""THEN26
KD 27 IFA$=CHR$(13)ANDCT>0THEN
    PRINT"LEFT":RETURN
DK 28 IFA$=CHR$(20)ANDCT>0THEN
    CT=CT-1:IN$=LEFT$(IN$,CT)
    :PRINT"LEFT"CHR$(20);
    :GOTO25
PA 29 IF(AS<"A"ANDAS<" ")ORAS
    >"Z"THEN26
GE 30 CT=CT+1:IFCT>8THENCT=8:G
    OTO26
AQ 31 PRINT" {WHT}{LEFT}"AS:IN
    $=IN$+AS:GOTO25
BQ 32 GOSUB205:SK=0
AA 33 PRINTLEFT$(DW$,22)TAB(5)
    "{WHT}ENTER SKILL LEVEL:
    {CYN}";SK$ (SK)
KD 34 GOSUB82:S=SK-(JR=8ANDSK<
    7)+(JL=4ANDSK>0):IFFB=0T
    HENSK=S:GOTO37
DD 35 IFS=SKTHEN34
AF 36 SK=S:GOTO33
SJ 37 GOSUB205:PRINTLEFT$(DW$,
    22)TAB(14)" {CYN}PLEASE
    {2 SPACES}WAIT"
DR 38 IFPL<4THENFORK=PL+1TO4:P
    L$(K)=CP$:NEXT
RE 39 SC(1)=0:SC(2)=0:SC(3)=0:
    SC(4)=0
AD 40 FORK=0TO18:FORL=0TO8:DI
    (K,L)=0:BL$(K,L)="" :NEXT:
    NEXT
GE 41 LM=15+10*SK:FORK=1TOLM
PA 42 A=FNRN(18):B=FNRN(8):IFB
    L$(A,B)<" "THEN42
RQ 43 BL$(A,B)=PC$(FNRN(3),0)+
    PC$(FNRN(3),1)+R$(PC$(FNRN
    (3),2)+PC$(FNRN(3),3))
QB 44 AS=BL$(A,B)
CC 45 C=FNRN(18):D=FNRN(8):IFB
    L$(C,D)<" "THEN45
AA 46 BL$(C,D)=AS:MT(C,D,0)=A:
    MT(C,D,1)=B:MT(A,B,0)=C:
    MT(A,B,1)=D
QS 47 MT(A,B,2)=0:MT(C,D,2)=0:
    NEXT
FD 48 FORK=0TO18:FORL=0TO8
PM 49 IFBL$(K,L)=""THENGOSUB51
```

```
:MT(K,L,0)=-1:MT(K,L,2)=
    0
KS 50 NEXT:NEXT:GOTO56
CM 51 C=FNRN(3)+1:ONGOSUB52,5
    3,54,55:RETURN
DX 52 BL$(K,L)=FI$:RETURN
MH 53 BL$(K,L)=HP$:RETURN
QQ 54 BL$(K,L)=SS$:RETURN
QE 55 BL$(K,L)=TH$:RETURN
JE 56 PRINT"CLR"TAB(2)"B1$#";
    FORK=1TO18:PRINT"$SPC(3
    8)"%;:NEXT
PC 57 PRINT"$B1$${4}"PL$(1)
    "{2 SPACES}"PL$(2)"
    {2 SPACES}"PL$(3)"
    {2 SPACES}"PL$(4)"TAB(2)";
GF 58 PRINT"$B2$${4}"SPC(38)"%
    &"B1$""HOME"
DR 59 FORK=2TO19STEP2:FORL=1TO
    19STEP2:PRINTLEFT$(DW$,K)
    SPC(L)VB$
EJ 60 PRINTLEFT$(DW$,K)SPC(38-
    L)VB$:NEXT:NEXT:QQ=FRE(0)
PG 61 PRINTLEFT$(DW$,23)"
    {RIGHT}";:FORK=1TO4:AS=S
    TR$(SC(K))
GF 62 Z=7:GOSUB204:B$="" "+CS+"
    ":PRINTCL$(K)B$;:IFK<4T
    HENPRINT" {2 SPACES}";
XJ 63 NEXT
SQ 64 PRINTLEFT$(DW$,25)TAB(10)
    "{CYN}PAIRS REMAINING:
    {SPACE}{WHT}";
XG 65 AS=STR$(LM):Z=3:GOSUB204
    :PRINTCS"HOME";:HI=-1:
    MX=OX:MY=CY
QB 66 IFLM<1THEN143
HR 67 CP=CP+1:IFCP>4THENCN=1
HS 68 GOSUB86:L=CP
QP 69 GOSUB87:IFPL$(CP)=CP$THE
    N164
AR 70 GOSUB82
MJ 71 DX=OX-(JR=8ANDOX<18)+(JL
    =4ANDOX>0):CX=DX
XA 72 DY=CY-(JD=2ANDCY<8)+(JU=
    1ANDCY>0)
GG 73 GX=GX-(GXAND1):IFDX>14TH
    ENCX=GX-16:GX=GXOR1
RE 74 OX=DX:CY=DY:IFFB=0THENG
    OSUB87:GOTO76
EP 75 GOTO69
BA 76 AS=BL$(OX,CY):IFDI(OX,CY)
    >0ANDAS<FB$THEN69
PR 77 B$=""{WHT}":IFA$=FI$THENB
    $=CL$(CP)
PD 78 ZL=- (AS=FI$)-2*(AS=TH$)-
    3*(AS=HP$)-4*(AS=SS$)-5*
    (AS=FB$)
AH 79 ONSPGOTO116,119
SE 80 HI=-1:SP=2:GX=GXOR-2*(PX
    >14):GOTO69
PQ 81 SP=1:GX=GX-(GXAND2):POKE
    V+21,GX:GOTO61
RX 82 JY=15-(PEEK(J)AND15):JU=
    JYAND1:JD=JYAND2:JL=JYAND
    4:JR=JYAND8
CE 83 FB=PEEK(J)AND16
```



```

MG 84 IFJU=0ANDJD=0ANDJR=0ANDJ
L=0ANDFB=16THENA=- (J=563
20)+(J=56321):J=J+A:GOTO
82
MF 85 RETURN
FA 86 FORK=0TO7:POKE56097+(LP-
1)*10+K,11:POKE56097+(CP
-1)*10+K,1:NEXT:RETURN
DC 87 Z=- (SP=2):POKEV+40,CL(5)
:POKEV+39,CL(CP)
AR 88 POKEV,28+16*CX:POKEV+16,
GX:POKEV+1,56+16*CY
HA 89 IFZ=1ANDOX=PXANDCY=PYTHE
NPOKEV+2,PEEK(V):POKEV+3
,PEEK(V+1)
SF 90 POKEV+21,1+2*Z:RETURN
JR 91 DI(Q1,Q2)=5:MT(Q1,Q2,2)=
MT(Q1,Q2,2)+.1
EB 92 PRINTLEFT$(DWS,Q2*2+2)SP
C(Q1*2+1)BSAS:BL$(Q1,Q2)
=AS:GOSUB202:RETURN
HD 93 PRINTLEFT$(DWS,Q2*2+2)SP
C(Q1*2+1)VB$:DI(Q1,Q2)=0
:NS=5:GOSUB200
EM 94 RV=RV-1:RETURN
GP 95 AS=FB$:BS=CL$(CP):DI(Q1,
Q2)=CP:LM=LM-.5:GOTO92
MM 96 DIMBL$(18,8),DI(18,8),PC
$(3,3),MT(18,8,2):SO=542
72
KS 97 DEF FNRN(X)=INT((PEEK(SO
+27)/256)*(X+1))
HH 98 DEF FNP(X)=(PEEK(SO+27)/
256)<X
DH 99 RS="{DOWN}{2 LEFT}":FIS=
"()"+RS+"*":HP$="{YEL}";
<"RS+"="":SS$="{RED}","-
+RS+"./":FH=0:HS=0
RC 100 FBS="{<?"+RS+"*Q":VB$="
{BLU} [{7}E{BLU}"+RS+"
↑":TH$="{8}E{N}"+RS+"
{>}{D}":CP$="COMPUTER"
DH 101 BL$="":B2$="":FORK=1TO3
8:BL$=BL$+CHR$(34):B2$=
B2$+"R":NEXT
RB 102 DWS="{HOME}{24 DOWN}":J
=56320
SG 103 FORK=0TO3:FORL=0TO3:PCS
(K,L)=CHR$(97+4*K+L):NE
XTL,K
MQ 104 FORK=0TO2:POKE49152+K,2
55:POKE49155+K,255:NEXT
QP 105 FORK=49158TO49203STEP3:
POKEK,224:POKEK+1,0:POK
EK+2,7:NEXT
XH 106 FORK=0TO2:POKE49206+K,2
55:POKE49209+K,255:POKE
49212+K,0:NEXT
HH 107 CL$(1)="{GRN}":CL$(2)="{
CYN}":CL$(3)="{RED}":C
L$(4)="{YEL}"
CH 108 CL(1)=5:CL(2)=3:CL(3)=2
:CL(4)=7:CL(5)=12
SR 109 DATA"SIMPLE{5 SPACES}",
"VERY EASY{2 SPACES}",
"RATHER EASY","ALMOST EA
SY","ALMOST HARD"
XS 110 DATA"RATHER HARD","VERY
HARD{2 SPACES}","DIFFI
CULT{2 SPACES}"
FG 111 FORK=0TO7:READSK$(K):NE
XT:RETURN
XP 112 V=53248:POKEV+21,0:POKE
V+16,0:POKEV+2,28:POKEV
+3,56
AH 113 POKE51192,0:POKE51193,0
:CX=0:CY=0:GX=0:CP=0:LP
=2:SP=1:OX=0
SK 114 FORK=0TO50+24:POKEK,0:
NEXT:RV=0:POKESO+15,255
:POKESO+18,128
CR 115 RETURN
EX 116 PX=OX:PY=CY:LZ=ZL:IFZL<
5THENQ1=OX:Q2=CY:GOSUB9
1
FC 117 ONZL+1GOTO80,80,80,118,
81,69
PR 118 SC(CP)=SC(CP)+250:GOTO8
1
KQ 119 IFZL<5THENQ1=OX:Q2=CY:G
OSUB91
KC 120 ONZL+1GOTO121,130,133,1
35,136,138
GH 121 ONLZ+1GOTO122,127,125
HC 122 IFAS<>BL$(PX,PY)THEN125
AE 123 SC(CP)=SC(CP)+100:Q1=OX
:Q2=CY:GOSUB95
BF 124 Q1=PX:Q2=PY:GOSUB95:GOT
O81
DS 125 FORK=1TO2500:NEXT
PS 126 Q1=OX:Q2=CY:GOSUB93:Q1=
PX:Q2=PY:GOSUB93:GOTO81
HK 127 FORK=0TO18:FORL=0TO8:C$
=AS
KM 128 IFAS=BL$(K,L)THENQ1=K:Q
2=L:GOSUB95:SC(CP)=SC(C
P)+50:AS=C$
SH 129 NEXTL,K:GOTO81
CC 130 ONLZ+1GOTO132,80
FS 131 GOTO81
DC 132 AS=BL$(PX,PY):GOTO127
KM 133 IFLZ=0THEN125
BX 134 GOTO81
RX 135 ONLZ+1GOTO125,118:GOTO8
1
FP 136 IFLZ=0THEN125
MA 137 GOTO81
HP 138 IFLZ<>2THEN80
BP 139 A=PEEK(55337+OX*2+(CY*2
)*40)AND15:IFA=CL(CP)TH
EN80
HA 140 LM=LM+.5:Q1=OX:Q2=CY:GO
SUB95:SC(CP)=SC(CP)+50
RF 141 FORK=1TO4:IFA=CL(K)THEN
B=K:K=5
HR 142 NEXT:SC(B)=SC(B)-50:GOT
O81
ES 143 POKEV+21,0:PRINT"{CLR}
{2 DOWN}{WHT}{3 RIGHT}F
INAL RESULTS:"PRINT"
{2}{RIGHT}"B2$
CS 144 PRINT"{4}{2 RIGHT}NAME"
,"SCORE","{2 LEFT}BLOC
KS WON{DOWN}"
XD 145 A(1)=0:A(2)=0:A(3)=0:A(
4)=0
JC 146 FORL=0TO8:FORK=0TO18:A=
DI(K,L):IFA>0ANDA<5THEN
A(A)=A(A)+1
BM 147 NEXT:NEXT
KQ 148 FORK=1TO4:PRINT"{DOWN}
{2 RIGHT}{BLU}"PL$(K),C
L$(K):AS=STR$(SC(K))
HF 149 Z=7:GOSUB204:PRINTCS,:A
$=STR$(A(K)):Z=4:GOSUB2
04:PRINTCS:NEXT
AF 150 PRINT"{3 DOWN}{2}
{2 RIGHT}!"LEFT$(BL$,34
)"#":FORK=1TO3:PRINT"
{2 RIGHT}$"SPC(34)"%":N
EXT
FK 151 PRINT"{2 RIGHT}&"LEFT$(
BL$,34)""
KR 152 HS=SC(1):W=1:FORK=2TO4:
IFSC(K)>HSTHENHS=SC(K):
W=K
HK 153 NEXT:PRINTLEFT$(DWS,20)
TAB(5)"{CYN}THE WINNER:
";
JS 154 FORK=1TO4:IFW=KTHENNEXT
:GOTO157
JG 155 IFSC(K)=HSTHENA=-K*(A(K
)>A(W))-W*(A(W)>A(K))-5
*(A(K)=A(W)):W=A
SQ 156 NEXT
MG 157 IFW=5THENPRINT"{RED}HIG
H SCORE IS TIED":GOTO15
9
DG 158 PRINT"{BLU}PLAYER"W"
{WHT}"PL$(W)
AP 159 PRINTLEFT$(DWS,24)TAB(8
)"{YEL}PRESS FIRE TO PL
AY AGAIN"
KA 160 GOSUB82:IFFB=0THEN3
MS 161 GOTO160
JR 162 MX=FNRN(18):MY=FNRN(8):
GOTO170
QK 163 NX=FNRN(18):NY=FNRN(8):
GOTO175
KH 164 ONSPGOTO165,174
SH 165 IFHI>-1THEN197
SD 166 IFMT(MX,MY,0)=-LANDBL$(
MX,MY)<>SS$THEN195
XF 167 MX=0:MY=0:FORL=0TO8:FOR
K=0TO18:A=FNRN(4)
SP 168 IFMT(K,L,2)>HIANDDI(K,L
)=0AND(A=0ORRV>160)THEN
MX=K:MY=L
BQ 169 NEXT:NEXT
AX 170 A=FNRN(1):NX=MT(MX,MY,0
):NY=MT(MX,MY,1):HI=MT(
MX,MY,2)
XB 171 IFMT(MX,MY,0)>-1THENIFN
OTFNP(MT(NX,NY,2)+SK*.0
02+RV*.001)ANDA=0THEN16
2
DA 172 IFDI(MX,MY)>0THEN162
CF 173 GOTO197
GE 174 IFHI>-1THEN197
JA 175 ONLZ+1GOTO176,180,183
XF 176 IFNX=-1THEN163
SQ 177 IFFN(9)=0THEN193
QP 178 IFMT(NX,NY,0)>-1THENIFN
OTFNP(MT(NX,NY,2)+SK*.0

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PROGRAMS

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02+RV*.001)ANDRV<170THE
N163
CE 179 GOTO193
PE 180 IFNX=-1THEN163
GF 181 A=FNRN(2):IFA=0THEN163
CD 182 GOTO193
XF 183 IFNX=-1THEN163
EC 184 A=- (FNRN(2)=0):IFLM=(15
+10*SK)THENONA+1GOTO163
,193
KH 185 NX=-1:FORK=0TO18:FORL=0
TO8:A=PEEK(55337+K*2+(L
*2)*40)AND15
PX 186 IFBL$(K,L)=FB$THENGOSUB
190:IFL=0THENK=19:L=9
BX 187 NEXT:NEXT
CP 188 IFNX=-1THENNX=FNRN(18):
NY=FNRN(8)
QG 189 GOTO194
PS 190 NX=K:NY=L:FL=0:IFA=CL(C
P)THENFL=1:NX=-1:RETURN
KE 191 B=FNRN(1):IFB=0THENFL=1
RD 192 RETURN
PQ 193 IFDI(NX,NY)>0THEN163
JK 194 HI=5:MX=NX:MY=NY:GOTO19
7
GH 195 IFLM=(15+10*SK)ANDBL$(M
X,MY)=TH$THEN162
GC 196 GOTO170
BS 197 JU=- (MY<CY):JD=-2*(MY>C
Y):JR=-8*(MX>OX):JL=-4*
(MX<OX)
EA 198 FB=16:IFOX=MXANDCY=MYTH
ENFB=0
CE 199 GOTO71
MH 200 POKESO+24,15:POKESO+5,9
:POKESO+6,0:POKESO,NS:P
OKESO+1,NS
PG 201 POKESO+4,33:FORSD=1TO10
0:NEXT:POKESO+4,32:RETU
RN
KQ 202 NS=175+75*(A$=FI$)+25*(
A$=HP$)+150*(A$=SS$)+10
0*(A$=TH$)-25*(A$=FB$)
XJ 203 GOSUB200:RV=RV+1:RETURN
MG 204 B$=LEFT$( "00000000",Z):C
S=LEFT$(B$,Z-LEN(A$))+R
IGHT$(A$,LEN(A$)-1):RET
URN
PX 205 POKE781,21:SYS59903:RET
URN

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BOGGLE.ML

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C800:7E C3 9D B1 B1 9D C3 7E 9A
C808:3E 77 77 7F 77 77 77 00 06
C810:7E 77 77 7E 77 77 7E 00 2C
C818:3E 77 77 70 77 77 7E 00 B2
C820:7E 77 77 77 77 77 7E 00 CB
C828:7F 77 70 7C 70 77 7F 00 8D
C830:7F 77 70 7C 70 70 70 00 5B
C838:3E 77 70 77 77 77 3F 00 64
C840:77 77 77 7F 77 77 77 00 DA
C848:7F 1C 1C 1C 1C 1C 7F 00 36
C850:07 07 07 07 77 77 3E 00 8E
C858:77 77 77 7E 77 77 77 00 E2
C860:70 70 70 70 70 77 7F 00 BB
C868:63 77 7F 7F 77 77 7F 00 F9
C870:7E 77 77 77 77 77 77 00 0E

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C878:3E 77 77 77 77 77 3E 00 83
C880:7E 77 77 7E 70 70 70 00 2C
C888:3E 77 77 77 77 7E 3B 00 A9
C890:7E 77 77 7E 77 77 77 00 9E
C898:3E 77 70 3E 07 77 3E 00 AB
C8A0:7F 1C 1C 1C 1C 1C 00 C7
C8A8:77 77 77 77 77 77 3E 00 50
C8B0:77 77 77 77 77 3E 00 07
C8B8:77 77 77 7F 7F 77 63 00 6B
C8C0:77 77 3E 1C 3E 77 77 00 34
C8C8:77 77 77 3E 1C 1C 1C 00 50
C8D0:7F 77 0E 1C 38 77 7F 00 22
C8D8:00 7F 7F 70 77 76 76 3A
C8E0:00 FE FE 0E EE 6E 6E 6E 6F
C8E8:76 76 76 77 70 7F 7F 00 1A
C8F0:6E 6E 6E EE 0E FE FE 00 7C
C8F8:00 7F 7F 7F 7F 7F 7F CA
C900:00 00 00 00 00 00 00 93
C908:00 FF 80 BF BF B8 BB BA BA
C910:00 FF 00 FF FF 00 FF 00 A3
C918:00 FF 01 FD FD 1D DD 5D 29
C920:BA BA BA BA BA BA BA B3
C928:5D 5D 5D 5D 5D 5D 5D BB
C930:BA BB B8 BF BF 80 FF 00 23
C938:5D DD 1D FD FD 01 FF 00 69
C940:FF 80 80 86 B6 B6 B6 89 F3
C948:FF 01 C1 D9 D9 81 7D 8D 4F
C950:9F 9F 8E 81 83 83 80 FF B0
C958:ED F9 F1 81 C1 C1 01 FF CE
C960:0F 1F 38 70 E3 C7 CF CE FD
C968:F0 F8 1C 0E C7 83 13 33 BC
C970:CC C8 C1 E3 70 38 1F 0F C4
C978:73 E3 E3 C7 0E 1C F8 F0 7F
C980:3E 77 77 77 77 77 3E 00 8D
C988:1C 7C 1C 1C 1C 1C 7F 00 DE
C990:3E 77 07 3E 70 77 7F 00 46
C998:3E 77 07 1E 07 77 3E 00 7E
C9A0:77 77 77 7E 07 07 07 17
C9A8:7F 70 70 3E 07 77 3E 00 9C
C9B0:3E 77 70 7E 77 77 3E 00 4D
C9B8:3F 77 07 0E 1C 38 70 00 2E
C9C0:3E 77 77 3E 77 77 3E 00 3A
C9C8:3E 77 77 3F 07 77 3E 00 CE
C9D0:00 1C 1C 00 1C 1C 00 40
C9D8:00 07 1F 33 6F 69 F1 FF 4A
C9E0:00 E0 F8 CC F6 96 8F FF C9
C9E8:FF CF 63 70 3C 1F 07 00 50
C9F0:FF F3 C6 0E 3C F8 E0 00 C2
C9F8:00 FE FE FE FE FE FE 0D
CA00:7F 7F 7F 7F 7F 7F 7F 00 16
CA08:00 7F 7F 60 6F 6F 6F 6F FA
CA10:00 FE FE 06 F6 F6 F6 F6 1E
CA18:6F 6F 6F 6F 60 7F 7F 00 26
CA20:F6 F6 F6 F6 06 FE FE 00 67
CA28:00 7F 7F 60 60 60 60 39
CA30:00 FE FE 06 06 06 06 20
CA38:60 60 60 60 60 7F 7F 00 28
CA40:06 06 06 06 06 FE FE 00 A5
CA48:00 7F 7F 60 60 6E 60 91
CA50:00 FE FE 06 06 76 06 02
CA58:60 60 6E 60 60 7F 7F 00 0A
CA60:06 06 76 06 06 FE FE 00 D3
CA68:00 7F 7F 60 6E 60 6E 00 06
CA70:00 FE FE 06 76 06 76 06 C4
CA78:60 6E 60 6E 60 7F 7F 00 CC
CA80:06 76 06 76 06 FE FE 00 09
CA88:FE FE FE FE FE FE 00 1F
CA90:00 00 FF 00 FF 00 00 26
CA98:80 C0 E0 F1 FB FF EE E4 7C
CAA0:2E 6E EE EE EE EE EE B5

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CAA8:81 C1 E1 F1 F9 FD EF E7 5A
CAB0:DF DF DF DC DC DC DC E8
CAB8:E7 F7 F7 77 77 77 77 B6
CAC0:F8 FD FD 1D 1D 1D 1D F9 75
CAC8:FE FF FF C7 C7 C7 C7 0F
CAD0:3F 7F 7F 71 70 70 70 77 8A
CAD8:8F DF DF DC 1C 1C 1C DD 5F
CAE0:E7 F7 F7 77 07 07 07 F7 39
CAE8:01 01 01 01 01 01 01 7E
CAF0:FF FF FF C0 C0 C0 C0 F8 16
CAF8:E0 E0 E0 E0 E0 E0 E0 8E
CB00:EE EE EE EE EE EE EE 97
CB08:E3 E1 E1 E1 E1 E1 E1 A0
CB10:DC DC DC DC DC DF DF BC
CB18:77 77 77 77 77 F7 F7 E7 23
CB20:F9 1D 1D 1D 1D FD FD F8 47
CB28:C7 C7 C7 C7 FF FF FE 48
CB30:77 71 71 71 71 7F 7F 3F EC
CB38:DD DC DC DC DC DF DF 8F 15
CB40:F7 77 77 77 77 F7 F7 E7 8B
CB48:00 7F 60 40 43 40 46 51 C8
CB50:00 FE 06 82 E2 02 62 8A FE
CB58:4E 4F 64 77 7B 7C 7F 00 BB
CB60:72 F2 26 EE DE 3E FE 00 8F
CB68:01 01 01 01 01 FD FD EA
CB70:F8 C0 C0 C0 C0 FF FF FF DE

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John Cameron lives in Newcastle, New Brunswick, Canada. □

TYPING AIDS

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